

THE AMERICAN  
JOURNAL OF PHARMACY.

NOVEMBER, 1888.

EMULSION OF OIL OF CHENOPODIUM.

BY HARRY JOSEPH MEYERS, PH. G.

Abstract from a Thesis.

The volatile oil distilled from chenopodium, U. S. P., is well known to possess both a characteristic odor and taste. The anthelmintic properties which render this oil valuable, confine its use to the relief of children requiring such medication. The use of capsules for dispensing this oil not being adapted for children the question arises—how can this remedy be disguised, both in odor and taste, so that a practicable and palatable preparation can be dispensed. The form of an emulsion would appear to offer the best means for administration, and a number of experiments were made.

Oil of chenopodium has three distinct features in its taste, each of which is objectionable and which must be disguised or ameliorated. The most repulsive of these is the nauseous effect produced; not less offensive is the bitterness developed; combined with them is a sharp pungency which has an irritating action on the throat. A basic emulsion was prepared and flavoring drugs were incorporated with it. The teaspoonful dose contains about four drops of the oil of chenopodium, which averages 135 drops to the fluid drachm.

R. Oil chenopodium.....	f $\frac{3}{4}$ i.
Expressed oil almond.....	f $\frac{3}{4}$ iv.
Powdered acacia.....	4 oz. av.
Water q. s. ad.....	Oii.

Mix the oils thoroughly in a dry mortar, add the acacia gradually, rubbing the mixture to a uniform paste. Then add the bulk of the water, and agitate rapidly until a smooth emulsion is formed. Meas-

ure the liquid, and add sufficient water to make one quart. Mix by agitation. This formula furnishes a milk white emulsion, rather thinner than some preparations of a similar composition, and, owing to the small quantity of oil present, necessitating less acacia. The emulsion is permanent, does not "crack," and possesses the odor and taste of the oil of chenopodium, but slightly modified.

Mixtures were made of this emulsion with the volatile oils of almond, gaultheria, coriander, staranise, cloves, allspice, lemon and orange peel in various proportions; also with purified extract of licorice, saccharin, yerba santa and celery seed. None would afford a palatable preparation, but licorice and celery seed greatly improved the odor and taste, and the following modified formula is suggested, as best meeting the object in view:

Celery seed .....	3 ii
Purified extract of licorice.....	3 i.
Powdered acacia.....	3 v.
Oil of chenopodium.....	3 <u>xxx.</u>
Oil of almond (expressed). .	3 ss.
Sugar.....	3 iv.
Water q. s. ad .....	3 iv.

Mix the seed with the extract and reduce to a very fine powder; triturate with sufficient water to form a thin liquid, and strain with expression. Emulsify the mixed oils in a dry mortar, with the acacia and sugar, using a little water if the paste becomes too thick. Finally add the strained liquid and form a perfect emulsion; add water to make the liquid measure four fluidounces.

The emulsion is a brown liquid, contains in a teaspoonful two drops of the oil of chenopodium, and has but a slight odor and a sweetish aromatic taste which is slightly pungent and cooling. The freshly prepared emulsion is to be preferred; but samples of it have been kept on hand for about a month, and were found to keep well, and to remain palatable. The addition of a small quantity of alcohol will render it still more permanent.

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**The dose of Salicin.**—According to Dr. McLagan (*The Lancet*), salicin must be given in large doses in rheumatism, from 20 to 40 grains every hour, until there is decided evidence of its action. Generally before an ounce is given improvement has taken place, and as the symptoms decline the dose may be diminished.

## PERMANENT SYRUP OF FERROUS IODIDE.

BY JOSEPH ENGLAND, PH. G.

Read at the Pharmaceutical Meeting, October 16.

Within the ever widening circle of modern pharmaceutical thought, there is probably no preparation in galenical pharmacy which from universal use and high medicinal value has been so fertile in criticisms and papers as syrup of iodide of iron. It would be trite and of little value for the writer to traverse ground so thoroughly familiar to you all, had he not secured what, in his opinion, was a perfectly practicable method of preserving this easily oxidizable liquid; a method against which there could be raised not the slightest objection on the score of chemical incompatibility or the introduction of objectionable compounds, and in favor of which, in this instance, everything could be fairly claimed as an ideal preservative.

Some months ago attention was attracted by the strong reducing action exercised by glucose upon ferric salts. If ferric salts, in aqueous solution, be slightly heated with glucose, especially syrupy glucose, they are quickly reduced to the ferrous state. A well known pharmacist of this city states that he has observed that pills of calomel, made with glucose, as an excipient, become reduced to black mercurous oxide. This property of reduction possessed by glucose, is a powerful and characteristic one, and is the one utilized in its quantitative estimation.

Such being the case, what is more reasonable than to assume that if it is opposed to oxidation so strongly, it would serve to protect easily oxidizable substances from oxidation, and practice bears out the truth that theory teaches. We have a familiar illustration of this application of glucose, although it is not generally recognized as such, in the preserving of "Vallet's Mass" with honey, and yet what ferrous compound is more prone to oxidation than ferrous carbonate?

Acting upon this idea, the writer made, early in last July, different specimens of ferrous iodide syrup, and first utilized, as more convenient, the commercial syrupy glucose; a mixture of glucose and dextrin. But this was found to be too powerful in its action. A large quantity caused the precipitation of ferrous oxide, and a small quantity permitted both oxidation and precipitation. Recourse was then had to solid glucose ( $C_6H_{12}O_6$ ), and this was found to be less re-

ducing in its action, and, in proper quantities, capable of preserving the syrup intact, without precipitation or decomposition.

A sample of the syrup made last July and kept in an ordinary five pint stock bottle, is here shown. You will observe that it is a clear, transparent, greenish liquid, odorless, having a sweet, strongly ferruginous taste. It is neutral, but it should be mentioned, however, that litmus paper is no test of its neutrality since glucose in solution, especially syrupy glucose, will redden litmus. With potassium sulphocyanide the presence of a ferric salt is contra-indicated. It has kept during that time, although freely exposed to air, without the slightest change in color.

Relative to the present pharmacopeial process, it is, in essentials, the same as that of 1870, but in it there seems to have been ordered a change of procedure without any sufficiently compensating advantages, when it was directed to filter the aqueous solution of ferrous iodide into the sugar, heat to the boiling point and dissolve, instead of following the older and simpler plan, of mixing the filtrate direct with syrup. If the U. S. P. 1880 syrup had been made so as to contain full 65 per cent. of sugar, as in simple syrup, instead of 60 per cent. then the change might have been consistently ordered on the score of preservation, but as long as this was not done, it practically made little difference between the two formulas.

The formula is as follows:

Iodine,.....	875 grains.
Iron wire(Card Teeth),.....	300 grains.
Water,.....	3 fluidounces.
Glucose (solid),.....	2 troy ounces.
Syrup, a sufficient quantity,	to make one pint.

Mix the iodine, iron and water in a flask, shake occasionally until the reaction has ceased and the liquid has lost its iodine odor. Then heat to 212° F. (100° C.), filter into a capsule containing the glucose, finely cut up, dissolve at a low heat upon a water bath, and add sufficient syrup to make the desired quantity.

The watery solution of ferrous iodide is directed to be heated, after the reaction has taken place in the cold, in order to have thorough chemical combination. Very often this cold solution, although the liquid has lost its iodine odor, is of a yellowish color, which, however, on the application of heat, becomes the normal green tint; showing that heat, at the latter part of the process at least, is essential. A

water bath for the solution of the glucose is ordered, in view of the facility with which solutions of solid glucose, when strongly heated, become yellow.

The chemical decomposition which syrup of ferrous iodide undergoes, on exposure to air, has always been a matter of great interest and the subject of repeated studies. Prof. J. M. Maisch most admirably describes them when he states<sup>1</sup> that "on exposure to air the color of the syrup slowly changes to yellow and afterward to brown, the change of color proceeding from the exposed surface downward. Diffused daylight seems to somewhat accelerate the decomposition, but exposure to direct sunlight entirely prevents the change, or, if it has taken place, restores the original color, and finally renders the syrup colorless. The effects of oxidation become manifest first by the production of a ferric compound, and soon afterward by the liberation of iodine, recognized by the blue color produced with starch paste; subsequently hydrate of iron containing variable quantities of iodine is precipitated and after a short time this precipitate is not wholly redissolved again under the influence of sunlight, though the solution becomes colorless, perhaps from the formation of hydriodic acid."

Now, what do these facts indicate? They show us that the chemical change is essentially one of oxidation, with the formation, first, of a ferric compound, and a yellow or brown color, through the liberation of iodine; and, secondly, the precipitation of ferric hydrate and iodine.

If the oxidized iron compound is a ferric one, and that is admitted, it cannot be normal ferric iodide ( $Fe_2I_6$ ), if such a compound does exist, which is disputed, since that compound, for its formation, would require more iodine than could be obtained from two molecules of ferrous iodide ( $FeI_2$ ), and hence if a ferric salt is formed, it seems probable that it is an oxysalt; that is, ferric iodide, whose iodine atoms have been partially replaced by oxygen atoms.

The change in color to a yellow or a brown, through the production of free iodine, most probably indicates the formation of hydriodic acid whose presence was first claimed by Mr. Richard Phillips, Jr.,<sup>2</sup> with its subsequent decomposition by the air into free iodine and water.

That there is an acid formed prior to the liberation of iodine is evi-

<sup>1</sup> National Dispensatory (3d Ed.) p. 1478.

<sup>2</sup> U. S. Dispensatory (15th Edt.) p. 673.

denced by the fact that the officinal syrup, although neutral in reaction when first made, gives, in the writer's experience, after a time an acid reaction with litmus, even when colorless.

There is no other iodine-derived acid which rapidly decomposes with the liberation of iodine than hydriodic acid, and it seems probable that the following chemical change may be the primary one:



In other words, ferrous iodide, in the presence of oxygen and water, is decomposed to yield, not ferric iodide,  $\text{Fe}_2\text{I}_6$ , since that is impossible, but ferric iodide, four of whose univalent iodine atoms have been replaced by two bivalent oxygen ones, to form an oxyiodide,  $\text{Fe}_2\text{I}_2\text{O}_2$ , and then hydriodic acid, through a combination of the displaced iodine with the freed hydrogen atoms of the water. The probability of the existence of this oxyiodide is strengthened in the fact that Pettenkofer<sup>1</sup> has obtained an oxychloride with ferric chloride and ferric hydrate, having an analogous formula,  $\text{Fe}_2\text{Cl}_2\text{O}_2$ .

It is admitted that in the absence of its quantitative estimation, as a distinct chemical compound, the existence of this ferric oxyiodide ( $\text{Fe}_2\text{I}_2\text{O}_2$ ) is purely theoretical. In view of the fact that the oxidation is a gradual one, the syrup being always, after oxidation commences, a variable mixture of ferrous iodide, a ferric oxysalt, free hydriodic acid, and iodine from decomposed hydriodic acid, it seems impossible to say just when *all* the ferrous salt has been oxydized into this ferric oxysalt if it all has been, prior to the formation of ferric hydrate, which is doubtful; and it seems impossible, then, to frame a method whereby its formula can be determined.

We know that, primarily, there is formed a free acid, which most probably is hydriodic acid, and that the formation of this acid is co-incident with the production of this ferric oxysalt, but we cannot assert that this oxysalt is  $\text{Fe}_2\text{I}_2\text{O}_2$  until it is proven such. It may be that there are possible by substitution only two ferric oxyiodides,  $\text{Fe}_2\text{I}_4\text{O}$  and  $\text{Fe}_2\text{I}_2\text{O}_2$ . In that case the formation of the first one in this instance could not take place, because we know that the formation of the hydriodic acid is, as before mentioned, coincident with the production of the ferric oxysalt, and we would then be compelled to receive as more probable the other,  $\text{Fe}_2\text{I}_2\text{O}_2$ , with the assertion that if, in order to form the hydriodic acid, we must have sufficient iodine

<sup>1</sup> Gmelin-Kraut, "Anorganische Chemie," vol. 3, p. 360.

to combine with the hydrogen of the water, while the freed oxygen of that liquid, with that of the air, go to form the ferric oxysalt, then the reaction could only be explained, in chemical equation, with  $\text{Fe}_2\text{I}_2\text{O}_2$ .

After the formation of this ferric oxysalt and iodine, there follows a precipitation of ferric hydrate, which carries down with it variable quantities of free iodine; naturally variable, according to the extent which the hydriodic acid present has decomposed. If this ferric oxysalt is  $\text{Fe}_2\text{I}_2\text{O}_2$ , then this secondary change could be explained thus:



Relative to the fact that direct sunlight decolorizes oxidized syrup of ferrous iodide, that is most readily explained on the ground of the well known reducing property possessed by the sun. This peculiar property has been utilized by Alfred Früh, in the preparation of a syrup of ferrous chloride from the officinal solution of ferric chloride (see A. J. P., 1882, p. 129), and another application of it is found in the recommendation of Hager, to deoxidize ferrous chloride which has been oxidized by exposure to air, by exposing it for several hours to direct sunlight, and hence it is easy to believe that ferric iodide in the presence of direct sunlight is reduced also.

Concerning the statement that the precipitated ferric hydrate, with its accompanying iodine, yields at first, on direct exposure to the sun, a colorless solution, that could be explained on the theory that there is yet remaining undecomposed a certain quantity of hydriodic acid, together with free iodine, which combine with the precipitated ferric hydrate to form a ferric iodide, or an oxyiodide, which is then reduced.

The older method of preserving syrup of iodide of iron with iron wire was apparently successful, because it permitted the freed hydriodic acid to combine with the iron before it could decompose into free iodine and water, but it seems plain that it did not prevent the formation of the ferric oxysalt and hydriodic acid, but merely preserved for a time the transparent color of the syrup, without retarding ultimate decomposition.

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**Savine in Cancer.**—According to Dr. Luce (*Ther. Monatsh.*), the persistent application, three times a week, of powdered savine and burnt alum has cured a case of cancer of the ear.

## ADULTERATION OF GROUND ELM BARK.

By GEORGE M. BERINGER, PH. G.

Read at the Pharmaceutical Meeting, October 16th.

Having had occasion recently to examine several samples of ground and pulverized elm bark, which were offered in quantity, I was convinced from physical qualities, odor, taste and lack of mucilage, that two samples—one pulverized, the other ground—offered by the same party, were largely adulterated. Surmising that the adulterant was grain of some kind, most likely corn, ground up with the bark; the smallest quantity of these samples boiled with distilled water gave with iodine an abundant reaction for starch. Pure elm bark (*liber alone*) should be free from starch.

Mr. Charles Bullock examined the specimen microscopically and detected both corn and potato starch. The potatoes were likely sliced and dried, and then ground up with the bark.

The following simple test would show the deficiency of mucilage in ground elm, and the likelihood of adulteration. Ten (10) grains of pure ground or pulverized elm bark, thoroughly shaken with one fluidounce of water, will in fifteen (15) minutes form a thick jelly-like mass of a good fawn color.

From the source from which these samples were produced, I have no doubt that a large quantity of such adulterated elm is in the market.

## EUPHORBIA PILULIFERA.

BY JAMES HICKS BUNTING, PH. G.

Abstract from a Thesis.

*Euphorbia pilulifera* is an annual herbaceous plant, thriving in all soils, and grows abundantly in the gardens and streets of the towns of tropical countries. It has been used to some extent in the form of decoction and fluid extract in asthma and bronchitis; also in neuralgia in conjunction with allied remedies. The freshly bruised leaves applied over a snake-bite, not only assuage the pain, but are said to remove the venom and heal the wound. A pinch of the dried powder, taken in some convenient menstruum, excites the heart and arouses the vital forces depressed by the poison.

An analysis was made of the drug in the chemical laboratory of

the Philadelphia College of Pharmacy. Using 50 gm. of the drug, powdered, results were obtained which may be summarized as follows:

SOLVENTS AND PER CENT.	REAGENTS, ETC.	CONSTITUENTS, ETC.
Petroleum spirit. Amount dissolved, 2·06 per cent.	Soluble in absolute alcohol. Soluble in 95 per cent. spirit. Residue from treatment with alcoholic potash.	Vegetable wax. Chlorophyll. Caoutchouc.
Stronger ether. Amount dissolved, 1·36 per cent.	Non-volatile principles, 0·56 per cent. Ferric chloride. HCl and dil. $H_2SO_4$ . Dried extract treated with absolute alcohol and water added. Reagents for alkaloids and glucosides. Volatile principle, 0·80 per cent.	Tannin. Chlorophyll. Resin. No change. Volatile acid.
Absolute alcohol. Amount dissolved, 1·13 per cent.	Gelatin. Dissolved out of dried extract by absolute alcohol and treated with water, etc. Reagents for alkaloids and glucosides.	Tannin. Resin and Chlorophyll. No change.
Distilled water. Amount dissolved, 10·9 per cent.	Precipitated by alcohol, 6·13 per cent. Incineration.	Veg. mucilage, 2·6. Sugar, 0·6. Other carbohydrates, 4·1. Ash, total amount, 4·77.
Water with 2 per cent. sodium hydrate. Amount dissolved, 2·6 per cent.	Precipitated by alcohol, 2 per cent. By incineration.	Mucilage and albuminoids. Ash, 0·6 per cent.
Water with 1 per cent. hydrochloric acid. Amount dissolved, 5·8 per cent.	Precipitated by $NH_4HO$ as Ammonium oxalate. By incineration.	Calcium oxalate 2·04 per cent. Ash, 3·4 per cent.
Chlorine water. Amount dissolved, 15·96 per cent.	Dissolved out by chlorine water. Residue.	Lignin. Cellulose, etc.

Undissolved residue, 60·19 per cent. Constituents: Wax, caoutchouc, chlorophyll, resin, tannin, sugar, mucilage, carbohydrates, albuminoids, calcium oxalate and other salts.

March, 1888.

**Mercuric Iodide soap** is stated (*Lancet*, May 12), to be a powerful antiseptic. The mercuric iodide is incorporated with the soap together with potassium iodide.

## DIOSCOREA VILLOSA.

By WILLIAM CHARLES KALTEYER, PH. G.

## Abstract from a Thesis.

Wild yam root, colic root, rheumatism root, are the names given to the rhizome of *Dioscorea villosa*, which grows from Maine to the far West and South. The rhizome and its preparations (fluid extract, tincture, infusion, so-called dioscorein) are mostly used by the eclectics, who consider them very efficacious in bilious colic. The rhizome of the plant was subjected to an analysis, Dragendorff's plant analysis being used as a guide.

Fifty gm. of the drug in No. 80 powder were treated with petroleum spirit at an ordinary temperature. This extracted 0.208 per cent. of a light-colored fixed oil and a crystalline wax. The wax separated from the oil, and, purified by treating with alcohol, crystallized in fine stellate needles, having a silky lustre, melting at 115°C. The oil and wax were soluble in absolute alcohol. No volatile oil was found in this extract, nor was any obtained by distillation from another portion of the drug. The drug after drying was next exhausted with ether; this extracted 0.450 per cent. of a solid resinous matter. The ethereal extract, treated with water and filtered, reduced Fehling's solution, due to a glucoside present, but this could not be investigated any farther. The drug was then treated with absolute alcohol, which extracted 8.440 per cent. of a resinous mass, having a very acrid and bitter taste, and totally soluble in water. Applying the usual tests for tannin, it was found not to exist in the rhizome. The aqueous solution, acidulated and rendered alkaline, was agitated successively with petroleum spirit, benzol, chloroform and ether, but nothing was taken up, the liquid retaining the same bitter and acrid taste as before agitation. The solution was then evaporated on a water-bath, dissolved in alcohol, evaporated again, redissolved in water, treated with purified charcoal, filtered and placed in a desiccator, when a brown amorphous substance was left, having a bitter and acrid taste, but all efforts made to crystallize this principle were unsuccessful.

To water the drug yielded 20.16 per cent. of solid matter having an acrid and salty taste, and containing 5.256 per cent. of saccharose, 0.257 per cent. glucose, 0.684 mucilage and extractive matter.

The portion of the drug which was insoluble in the foregoing menstrua, was then treated with 0.2 per cent. solution of caustic soda, and

yielded 6.65 per cent. of extract, consisting of 1.98 per cent. of albumen and 4.67 per cent. of phlobaphene.

A 2 per cent. solution of hydrochloric acid extracted 0.920 per cent. of extractive matter.

The drug was then boiled with dilute sulphuric acid to convert all the starch present into glucose; it amounted to 7.425 per cent.

The residue on being treated with chlorine and chlorine water lost 3.66 per cent. in weight due to the amount of lignin dissolved. Treatment with nitric acid (sp. gr. 1.16) and chlorate of potassium, dissolved 0.980 per cent. of intercellular substance. The residue consisting of cellulose amounted to 32.440 per cent.

Another portion of the drug yielded 7.25 of moisture and 2.38 per cent. of ash.

Distillations of fresh portions of the drug with lime and with sulphuric acid yielded nothing of importance.

From all the tests applied in the foregoing, the conclusion is reached that there is saponin or an allied substance present in considerable quantity. Upon agitation of the aqueous solution, the characteristic froth of saponin was produced and the acid taste which characterizes this principle was plainly apparent to the taste, but all efforts made to separate above principle in a crystalline state were fruitless.

## GLEANINGS FROM THE GERMAN JOURNALS.

BY FRANK X. MOERK, PH. G.

*Conium Fruit Extracts.*—The alkaloidal determination presents so many obstacles that for it was substituted the amount of precipitate caused by Mayer's reagent in an acidulated aqueous extract, every cc. reagent representing 0.0138 gm. In the U. S. extract correction had to be made for the glycerin which reduces the quantity of Mayer's reagent.

AUTHORITY.	Yield of Extr. from drug.	Solid mat- ter in Ex- tract.	Precipitated Substance calculated in per cent. for			Percent- age of pre- cipitable substance extracted.
			Normal Extract.	Dry Extr.	Material.	
Fruct. Conii .....	.....	.....	.....	.....	0.495	100.0
Extr. Gall.....	10.8	81.4	2.491	3.057	0.269	54.3
“ U. S. ....	15.2	.....	3.255	.....	0.494	99.9
“ Intern.....	10.4	73.3	3.970	5.416	0.421	85.2
“ Fl., U. S. ....	94.8	11.6	0.538	4.655	0.494	99.9

Conium leaves contained only 0·24 per cent. of matter precipitated by Mayer's reagent.—R. Kordes, *Pharm. Ztschr. f. Russl.*, 1888, 455.

*Narceine* has been carefully studied by Claus and Meixner (*Journ. Prakt. Chem.*) and a close relationship to naphthalin disclosed. By oxidation of pure narceine  $C_{23}H_{29}NO_8$ , with permanganate in dilute sulphuric acid solution a tribasic acid narceinic acid,  $C_{15}H_{15}NO_8 + 3H_2O$ , was gotten which on heating to 180°–200° decomposed into carbonic oxide, dimethylamine and dioxy naphthalic acid  $C_{12}H_8O_6$ .—*Rdsch.*, 1888, 700.

*Secale cornutum* in drying should be placed in thin layers, the last portions of moisture being removed over lime or sulphuric acid in a dessicator. Stored in corked yellow bottles so-dried ergot will keep for several years and be of superior quality.—F. Alpers (*Pharm. Ztg. Chem. Rpt.*, 1888, 233).

*Unguentum boroglycerinatum*, a substitute for iodoform and carbolic acid ointments and a superior preparation of boric acid, is made by taking of boric acid, 10 parts, and glycerin (sp. gr. 1·23), 30 parts, boiling for 10 minutes; after cooling to 50° make an ointment by addition of lanolin 40 parts, finally add paraffin ointment (sp. gr. 0.890) 20 parts. This last addition has the effect of diminishing the rapid absorption of lanolin. In appearance the ointment resembles cold-cream.—Koehler, *Schweiz. Wchnschr. f. Pharm.*, 1888, 261.

*Liquor ferri dialysati and oxychloridi*.—M. C. Traub finds that there are decided differences in the properties of these two preparations, and disapproves of the substitution of the latter for the former. The oxychloride solution is made by dissolving ferric hydrate in hydrochloric acid; it contains 0·8 per cent. HCl, is of a decided acid taste and reaction, and is not adapted for making the albuminate solution owing to its frequent gelatinization. The dialyzed solution contains only 0·25 per cent. HCl, is of a mild taste and neutral reaction, and will form a permanent albuminate solution.—*Schweiz. Wchnschr. f. Pharm.*, 1888, 255.

*Carbon disulphide in oil of mustard*.—The first detection of carbon disulphide in the volatile oil of mustard was attributed to adulteration, but the statement of the producer that his oil was made from the seeds of *Sinapis juncea* caused new experiments to be made as the result of which Hoffmann established the presence of carbon disulphide in the oil of *Sinapis juncea*, as well as in the oil of *Brassica nigra* and the artificially prepared oil. Paul Birkenwald uses the following mode

of examination: 1 cc. is measured into a tared stoppered flask, the weight of the oil ascertained, 10 cc. absolute alcohol added to dissolve the oil and agitated after addition of 20 drops of an alcoholic potassium hydrate solution until the odor of the oil has entirely disappeared. The contents of the flask are then dissolved in water, acidulated with acetic acid and titrated with  $\frac{1}{10}$  n. copper sulphate solution (12.47 gm. per liter). The end of the reaction is ascertained by obtaining a red coloration or precipitate if a drop of the solution is placed on blotting paper and a drop of potassium ferrocyanide solution added. Each cc. of the copper solution represents 0.0086 gm. carbon disulphide.

According to age and quality of the oil from 8.14 per cent. to 41.03 per cent. of  $\text{CS}_2$  were found; self-prepared oil of mustard contained from 9.82 per cent. to 10.82 per cent. diminishing in a year's time to 2.03 per cent. (one specimen to 0.91 per cent.) of  $\text{CS}_2$ ; the artificial oil averaged 10.78 per cent. The origin of the  $\text{CS}_2$  is not definitely made out, but the decomposing effect of steam and the presence of  $\text{KHSO}_4$  influence its formation; by heating oil of mustard with  $\text{KHSO}_4$  an increase of  $\text{CS}_2$  from 0.45 to 2.29 per cent. was observed. The oil obstinately retains the carbon disulphide, and they can not be separated completely by distillation. A comparative examination of the seeds of *Brassica nigra* and *Sinapis juncea* was made:

	Brassica nigra.	Sinapis juncea.
Moisture.....	8.47 p. c.	7.63 p. c.
Ash.....	5.04 "	4.52 "
Phosphoric Acid.....	1.84 "	1.89 "
Soluble in Petrol. Spirit	29.37 "	30.10 "
"    Ether .....	0.93 "	1.30 "
"    Abs. Alcohol	0.80 "	1.25 "
"    75 p. c. "	6.77 "	6.40 "
Nitrogen.....	4.50 "	4.21 "
Sulphur .....	0.61 "	0.54 "
Vol. Oil (calcul. from amount of S.).....	1.89 "	1.67 "

—P. B. in *Schweiz. Wehnschr f. Phrm.*, 1888, 277.

*Mel rosatum*.—1 part rose leaves and 6 parts boiling water are mixed and allowed to macerate for 24 hours in a covered vessel. To the strained liquid is added 9 parts crude honey, and this solution heated on the water bath until the precipitate coagulates, which, after cooling, is filtered off; the filtrate is evaporated to a syrupy consistency. The tannin of the rose leaves unites with the albuminous principles of the honey, and after the removal of the precipitate a honey

is obtained, which remains transparent and will not ferment.—*E. Schaaff, Apoth. Ztg.*, 1888, 680.

*Chloroform*—Tests of purity for.—The use of chloroform as an anæsthetic calls for a preparation which shall stand the following tests:

1. Three hundred gm. are distilled on a water-bath until about 2 cc. remain in the flask or retort; on addition of concentrated  $H_2SO_4$  to this residue no darkening should take place, nor should an odor of amylic compounds be developed.

2. Forty gm., shaken repeatedly with 30 gm. concentrated  $H_2SO_4$  in a glass-stoppered bottle, previously rinsed with  $H_2SO_4$ , should not darken within 48 hours.

3. The chloroform decanted from the above test, after the addition of a zinc iodide starch solution, should not blue this, and should not itself become red.

4. The chloroform from 2 shaken with distilled water, and the latter filtered into solution of silver nitrate, should cause no change.—*Schwarz and Will., Pharm. Ztg.*, 1888, 551.

*Chloroform*, flavored with oil of cloves, is recommended by Prof. Nussbaum in cases in which pure chloroform produces nausea and vomiting.—*Rdsch.*, 1888, 759.

*Rose water*, made with magnesium carbonate and used in eye-waters containing salts of lead or zinc, will produce precipitates which may be very irritating.—*Kottmayer, Pharm. Post*, 1888, 598.

*Examination of Strychnos Extracts*.—The extracts, if fluid, evaporated under an air-pump to thick consistence in order to remove alcohol, are triturated with water, and after the complete removal of the fat by agitating with petroleum spirit, the mixture is evaporated to dryness, mixed with lime, and extracted for  $1\frac{1}{2}$  hours with ether in a continuous displacement apparatus. The ether is removed by evaporation, the residue dissolved in a little alcohol, 10 cc. water added, and this solution titrated with  $\frac{1}{10}$  n. sulphuric acid. The extraction is repeated with a second portion of ether for one hour, the acid required in this neutralization being added to the first quantity. Every cc.  $H_2SO_4$  used is considered the equivalent of 0.00364 alkaloid (the brucine and strychnine being assumed present in equal ratio). In the aqueous extracts, the brucine is present in three times the amount of the strychnine, due to the greater solubility of the former in water. In the following table attention has been given to points of interest in the processes for making the extracts:

STYRACHNOS EXTRACTS.—R. Kordes, *Pharm. Ztsch. f. Russl.*, 1888, 537.

\* Followed by percolation.

\* Followed by percolation.  
† The seed yielded to petroleum spirit 4·2 per cent. oil, solid at ordinary temperature.

*Glycerin Suppositories.*—Ten parts dry, dialyzed stearin soap are dissolved in boiling water, mixed with 90 parts pure glycerin, filtered by means of a hot-water funnel, the filtrate evaporated to 100 parts and poured into moulds. Two sizes are made, weighing respectively 1·7 and 2·5 gm., corresponding possibly to our 15 and 30 gm. suppositories. They are wrapped in tin-foil, to prevent absorption of moisture.—*E. Dieterich, Pharm. Centralh.*, 1888, 445.

*Oleum cinereum benzoatum*; improved formula.—20 parts mercury are triturated with 5 parts of an ethereal benzoin solution (ether 40, benzoin 20, oil of sweet almond 5; after solution, filter) until the ether has evaporated, when 40 parts fluid paraffin are added and the trituration continued.—*Dr. Harting, Pharm. Post*, 1888, 600.

*Test for free sulphuric acid.*—Egger proposes the furfural color reaction (see *AMER. JOUR. PHAR.*, 1888, p. 506) as a test for free sulphuric acid, and his experiments show that 1 cc. of  $\frac{1}{1000}$  normal sulphuric acid (containing 0·000049 gm.) warmed on a water-bath with a small particle of cholic acid and two drops of a furfural solution, will give a decided red coloration.—*Chemiker Ztg.*, 1888, 1245.

*Permanent starch paste* for volumetric analysis, also for technical purposes, is made by mixing 50 parts potato starch and 0·1 part biniodide of mercury with a little water and adding this mixture free from lumps to 10·000 parts boiling water (for technical use less water is taken and the paste boiled); after standing the liquid is decanted. This solution will not lose its sensitiveness if kept for a year.—*Gastine (Bull. Soc. Chim.) Rdsch.*, 1888, 783.

*Creolin* according to B. Fischer contains hydrocarbons 66, phenols 27·4, organic bases 2·2, ash 4·4, composed of  $\text{Na}_2\text{SO}_4$ ,  $\text{NaCl}$  and  $\text{Na}_2\text{CO}_3$ . It is made by freeing that portion of coal-tar boiling between 180 and 220° from carbolic acid. Its property of emulsifying with water is probably due to the presence of small quantities of phenol sulphonates and pyridine sulphonates.—*R. Otto, Phar. Cntrlhalle*, 1888, 467.

*Creolin-iodoform*, a mixture of iodoform with one or two per cent. creolin, is considered by Dr. Jaksch to be the best antiseptic and deodorized preparation of iodoform yet offered. It is of a faint aromatic odor, soluble in alcohol and ether; water removes the creolin, leaving the iodoform.—*Pharm. Post.*, 1888, 630.

*Liquor antisepticus*.—Menthol 0·2, thymol 0·5, boric acid 2·0, sodium salicylate 1·0, sodium benzoate 1·0, oil of gaultheria gtt. vi,

oil of eucalyptus gtt. xviii, glycerin 15·0, liquirit 60, water 180·0.  
—Apoth. Ztg. 1888 No. 56.

*White wax* obtained from yellow wax by sun bleaching does not differ from this in composition ; if, however, yellow wax be bleached by use of chemicals the product is altered considerably, so that it may even be pronounced adulterated by the analyst. Hübl finds that the ratio of *acidity* to the *compound ether* is as 1 : 3·7, and this has been confirmed by other investigators.

*Acidity* represents the number of milligrams of KOH required to neutralize a warmed alcohol mixture containing 1 gm. wax ; this figure should be between 19 and 21. *Compound ether* figure is obtained by boiling for one hour the above neutralized wax with excess of alcoholic KOH ; the neutralized KOH, in milligrams, furnishes the figure, varying between 73 and 76. The *saponification* figure is the sum of the *acid* and *compound ether* figures and should be between 92 and 97.

The following figures have been ascertained by Hübl for wax and some of the possible adulterants :

	Acidity.	Compound Ether.	Saponification.	Ratio.
Yellow Wax,	20·00	73·80	93·88	1·3·67
White " sun bleached,	19·87	74·95	94·82	1·3·77
"    " chemically, "I,	22·02	76·15	98·17	1·3·45
"    " " II, 24·00		74·56	98·56	1·3·10
Japan "	20·	200·	220·	1·10
Carnauba Wax,	4·	75·	79·	1·19
Tallow,	4·	176·	180·	1·44
Stearic Acid,	195·	—	195·	—
Rosin,	110·	1·6	112·6	1·015
Paraffin,	—	—	—	—
Ceresin,	—	—	—	—

—Chem. Ztg., 1888, p. 1277 and Pharm. Ztsch. f. Russl., 1888, 579.

*Fluid Extract of Hydrastis* on standing deposits a yellow precipitate which is generally considered to be berberine or one of its derivatives. By recrystallization from glacial acetic acid this substance is obtained in colorless crystalline scales, melting at 133°, which on examination prove to be *phytosterin*, a vegetable cholesterin-like body. *Fluid Extract of Berberis Aquifolium* also contains this principle.

The *berberine sulphate* of the market, even when marked *chemically pure*, was found to contain chlorine. The alkaloid *berberine* can be obtained pure by dissolving the salt in acetone and crystallizing ; the resultant acetone berberine is dissolved in alcohol and decomposed by

passing  $\text{CO}_2$  through the solution, the precipitate formed consists of *pure berberine carbonate*, which, if warmed in a current of hydrogen, yields the pure alkaloid.—*E. Schmidt, Pharm. Ztg.*, 1888, 572.

*Stylophorum diphyllosum, Nuttall.*—The root of this American plant contains chelidonine with a second alkaloid closely related to, if not identical with chelerythrine.—*E. Schmidt, Pharm. Ztg.*, 1888, 572.

*Corrosive sublimate bandages* after a time contain the mercuric chloride in an insoluble form; from the results of M. Haupt, the material used for the bandage appears to have some effect on this change. Wadding after seven months retains one-half of the mercuric chloride in soluble form, with mull this point is reached after five months, and with cambric in about three months; this change gradually becomes complete, as specimens (one year old) contained either very small quantities or none at all. To preserve the solubility of the  $\text{HgCl}_2$ , additions of aridium chloride or tartaric acid are made. In examining bandages which should contain 0·4 per cent  $\text{HgCl}_2$  it was observed that the quantity never exceeded 0·335 per cent., indicating a loss of 16 per cent. occasioned by drying the impregnated material. *Pharm. Centralh.*, 1888, 458.

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## ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for the AMERICAN JOURNAL OF PHARMACY.

**PURIFIED WATER.**—The boiling of water "to kill the microbes" has sometimes been recommended by physicians. M. Tellier has shown that this cannot be effected by a temperature of 212° F. He also observed that boiled water, being deprived of its air, is heavy and indigestible, and that through loss of the calcareous salts it becomes insipid, and is disagreeable to drink. He prepares water in a closed vessel, placed in a salt and water bath, by which he gets a temperature of 300° F. In using, the water is drawn from a filter-faucet placed near the bottom of the vessel. A small faucet at the top, to admit the air, is kept covered with cotton.—*Arch. de Phar.*, Oct. 5, 1888.

**TOILET CREAM OF LANOLIN.** M. Fassati sends the following formula to the *Arch. de Phar.*, Oct. 5, 1888, which he declares to be "very efficacious for tan, pimples, acne, and other simple affections of the skin": Lanolin, 5 gm.; sulphur (precip.), 5 gm.; oil of sweet almonds, 5 gm.; oxide of zinc, 2·50 gm.; ext. violet, 50 cgm.; ext. alkanet q. s. to obtain a flesh tint. It should be applied as a very thin

coat, over which starch or steatite may be powdered. The lanolin makes it easily absorbable, and its color renders it suitable for use in the day-time.

**CREOLIN PILLS.**—Spoeth's formula is given by the *Semaine méd.* as follows: Creolin, 12 gm.; dilute alcohol and tragacanth, of each, 2 gm.; ext. and powder of licorice, of each, 24 gm.; divide in 200 pills, each of which will contain 6 egm. of creolin. They are especially recommended by M. Spoeth for arresting abnormal fermentation in the intestines in all infectious maladies.—*J. de phar. et de chimie*, Oct. 1, 1888.

**TO MAKE POROUS ALUM.**—Make a solution free from iron, and concentrate it in an evaporator; add minute quantities of bicarbonate of sodium and stir briskly. The carbonic acid gas gives the required porosity to the crystalline mass.—*Farm. Ital.*; *Arch. de Phar.*, Oct. 5, 1888.

**SOLUBILITY OF COMPOUNDS OF IRON WITH ARSENIC.**—In a report published in the *Jour. de phar. d'Als.-Lorr.*, Sept. 1888, Schlagdenhauffen and Reeb conclude that: The solubility of samples of arseniate of iron—obtained from various sources—is not the same. None of the arsenical compounds with iron are so insoluble as writers have supposed them; they dissolve in the proportion of 2½ to 1000 in water acidulated with hydrochloric acid, and some samples dissolved in pure water. The hydrated sesquioxide of iron cannot, therefore, be *par excellence*, the antidote for poisoning by arsenic.

**IDOFORM AS A HÆMOSTATIC.**—Chauvin and Jorissen report great success with iodoform in hemorrhages from the lungs and other serious hæmoptyses; relapses were rare and of lessened severity; it succeeded where ergotin was inert. In a majority of cases the iodoform was associated with tannin in small doses, but the authors regard iodoform as the active agent. The formulæ used are as follows: 1. Iodoform, 5 egm.; ext. gentian, or quinine, q. s. for one pill. 2. Iodoform, 5 egm.; tannin, 10 egm.; any suitable excipient; for one pill. Dose, 3 to 5 pills daily. In six months of successful treatment it was rarely necessary to give more than 8 or 9 pills daily.—*Revue méd.*; *Monit. thérap.*, Oct. 1, 1888.

**ANILINE POISONING.**—An interesting case is described by Dr. Dehio, *Ann. d'hyg.*; *Bull. com.*, September, 1888. A young woman, recently delivered, swallowed 10 gm. of aniline. The symptoms, quickly manifested, were cyanosis, acceleration of pulse, dilation of

of the pupils and aniline odor of breath. The immediate effects on the nervous system were shown in 24 hours by coma, absence of cutaneous reflexes and voluntary motion, quick pulse (132), increased respiration (25), and profuse transpiration, the latter occurring 30 hours after ingesting the poison. On the second and third days the improvement was marked. Besides the purely nervous symptoms there was an abnormal coloration of the skin. Twenty-one hours after ingestion the urine contained traces of the colorants of the bile, and the serum was yellowish-red; from the second to the fifth day the urine contained more and more biliary pigment; on the third day an icterus appeared, which lasted until the ninth. A dark color of the urine from the sixth to the tenth day was due to haemoglobinuria; the urine afterward became normal. The destruction of sanguineous globules was rapid and formidable; the normal 5,000,000 per ccm. fell to 2,700,000 on the seventh, and 1,400,000 on the eleventh days. The globules were replaced slowly; on the eighteenth day their number was about one-third of the normal quantity. Convalescence returned with the disappearance of haemoglobinuria. Aniline may be classed with those poisons which produce the latter condition simultaneously with icterus.

**STRYCHMOL, OR HYDRATE OF STRYCHNINE.**—This is obtained as a white precipitate by boiling strychnine in a solution of caustic soda with alcohol, evaporating and directing a jet of carbonic acid gas upon the residuum after dissolving it in water. The reaction of strychnine with chromate of potassium is not obtained with strychnol. With sulphuric and nitric acids, strychnol gives a bright, carmine color. Boiled in dilute acids it decomposes into strychnine and water. Its formula is  $C^{21}H^{22}N^2O + H^2O$ .—*Le monde phar.*, Sept., 5, 1888.

**ARGANINE.**—M. S. Cotton of the Lyons Pharmaceutical Society has completed a study of the Argan tree, indigenous to Madagascar, and known to Europe through its wood, which is used by cabinet makers. From the argan nut the natives express an oil which they use for culinary purposes; the cake is fed to cattle. This oil, treated with Poutet's reagent (mercury and nitric acid) thickens in about twelve hours, but does not solidify like olive oil. The nut contains about 2 per cent. of vegetable albumin; the quantity of oil in it varies from 66 to 77 per cent. Its bitter principle, though insoluble in ether, chloroform, sulphide of carbon and mineral oils, dissolves readily in alcohol 90 per cent. and in water. It crystallizes from alcohol in small, short,

brilliant prisms. With sulphuric acid it forms a definite combination appearing in beautiful elongated prisms. M. Cotton has given the alkaloid the name "arganine" in memory of its botanic origin.—*J. de pharm. et de chim.*, Oct. 1, 1888.

**HEDWIGIA BALSAMIFERA.**—Gaucher, Combemale and Marestang describe this plant to the *Acad. des Sci.*, as one of the terebinthaceæ growing in the Antilles. The authors tested its physiological effects with extracts from the bark of both roots and stems, given hypodermically to guinea-pigs. It caused rapid and considerable lowering of temperature; progressive paralysis; generalized convulsions; pupillary dilation; vaso-dilator phenomena; and, in mortal intoxication, respiratory irregularity and cardiac paresis. They found it to be a nerve poison, hypothermic, paralyzing and spasmodic, affecting the medulla. The extract was observed to contain an alkaloid and a resin, the former being more especially a convulsivant and the latter a paralyzing agent. The resin appears to be more active than the alkaloid. Apart from its antithermic qualities, the extract seems to act like curare.—*L'Union méd.*, Oct. 6, 1888.

**SALICYLATED EGGS.**—According to the *Bull. de pharm. de Lyon*, the merchants of that city are now preserving eggs in salicylated water instead of lime water. The merchants claimed that the preservation was due to the fact that the water was kept purified by the acid, which latter could not, however, penetrate to the substance of the egg. M. Lambert, a local pharmacist, finds nevertheless, that the salicylic acid passes through the membrane by endosmosis and becomes diffused into the yolk. His tests were as follows: Beat up the white with a little acidulated water and agitate with ether, which, on evaporation leaves the salicylic acid, characterized by its reaction with weak perchloride of iron. The same method is used for the yolk, whose albumen should first be coagulated by heat in order to keep the oil from emulsifying.

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**The Abuse of Antipyrin.**—That antipyrin is being very generally used without the advice of a physician, appears from the evidence which has been obtained from both physicians and druggists. It is said to be not an uncommon thing for those who suffer from headaches to purchase the drug and take it in twenty grain doses, entirely unconscious that they run any risk in so doing. Evidence is accumulating that antipyrin so used is fraught with danger, and there are already enough cases recorded of the production of alarming symptoms by small doses to put even physicians on their guard against the indiscriminate use of the drug.—*Brooklyn Medical Journal*, June, 1888.

THE AMOUNT OF WATER OF CRYSTALLIZATION IN MORPHINE.<sup>1</sup>

BY O. HESSE.

Until recently it was generally considered that morphine dried at 100° C. had the composition represented by the formula  $C_{17}H_{19}NO_3 + H_2O$ , notwithstanding that several years since I pointed out that at this temperature the alkaloid would lose its water of crystallization. Subsequently, however, Dott showed<sup>2</sup> that morphine is already anhydrous at 90° C. Dieterich has also recently found<sup>3</sup> that the above formula does not hold good for the alkaloid dried at 100° C., and is equally inapplicable to the air-dried substance, since, instead of the calculated amount of water (5.94 per cent.), 6.39 per cent. was obtained. Dieterich, however, only carried out one experiment, so that control was wanting. Meanwhile it must be remembered that Dott also found more water, and upon the basis of his experiments represented the air-dried alkaloid by the formula  $8(C_{17}H_{19}NO_3) + 9H_2O$ , which requires 6.62 per cent. of water, whilst the average of that found was 6.56 per cent.

Against this average value, however, some objection can be raised. In the first place it may be observed that morphine frequently encloses small quantities of the solvent from which it has been separated, and which under ordinary conditions escapes with difficulty or not at all. In order therefore to render this accident harmless in the determination of the water it is necessary to rub the crystals to a fine powder, which Dott does not appear to have done, so far as can be inferred from his communication.

The last two quantities given—6.22 and 6.35 per cent.—correspond very well with the formula hitherto accepted, but differ considerably from the quantity calculated for the more complex formula and also that found by Dieterich. As Dieterich found practically more water than Dott, it seemed to me that an occasion presented itself to me to repeat my determinations on the point. A freshly precipitated preparation, operated upon in accordance with the previously mentioned facts, gave, after forty-eight hours, water of crystallization

<sup>1</sup> From the *Pharmaceutische Zeitung*, August 11.—Reprinted from *Pharm. Journal and Transactions*, August 25, p. 148.

<sup>2</sup> *Pharm. Journal*, [3], xviii., 701.

<sup>3</sup> *Pharm. Centralhalle*, 1888, p. 317.

equal to 5.99 per cent., and after a further forty-eight hours equal to 5.91 per cent. The temperature of heating reached 110° C.

The correspondence of the value found with that calculated for the value  $C_{17}H_{19}NO_3 + H_2O$ , is evidently such as to leave no doubt as to the correctness of that formula, and it may therefore be assumed that the excess of water which Dieterich found depended only upon accident.

### ALKALOIDS IN HUMAN URINE.<sup>1</sup>

By J. L. W. THUDICHUM.

The urine was mixed with 5 per cent. of sulphuric acid previously diluted with twice its own volume of water, and the alkaloids were precipitated by phosphomolybdic or phosphotungstic acid. The precipitate was washed, treated with barium hydroxide and barium carbonate, care being taken to avoid an excess of hydroxide, and the deep red solution thus obtained was filtered. If ferric chloride is added to the red liquid, it produces a bulky precipitate, which contains *urochrome*, the coloring matter of the urine in combination with iron. This urochrome may be isolated in several different ways, and then treated with sulphuric acid, or the precipitate may be treated directly with the acid. In either case, the product answers to the description given by Proust in 1881. It is a deep, violet-red, bulky precipitate, which when treated with ether yields a resin and a mixture of omicholin and omicholic acid. The portion insoluble in ether consists of a red compound, *uropittin*, soluble in alcohol, and a black resin, *uromelanin*.

*Omicholin* has approximately the composition  $C_{24}H_{38}NO_5$ , and is a red, resinous substance, insoluble in ammonia, but soluble in ether and alcohol. Its solution shows a bright green fluorescence, and gives an absorption-spectrum consisting of a band between D and E.

*Omicholic acid* has the composition  $C_5H_{22}NO_4$ , and is also a resinous, red substance soluble in ether or alcohol, forming a solution which shows a green fluorescence and gives an absorption-band between D and E. This band is, however, narrower than the band given by omicholin. Omicholic acid is soluble in ammonia, and is reprecipitated by acids.

*Uropittin* was not obtained pure. It is always mixed with one or

<sup>1</sup> *Compt. rend.*, cvi., 1803—1806; reprinted from *Jour. Chem. Soc.*, October, p. 1119.

other of its modifications, *meta-uropittin* and *uro-rubin*, and is partially altered by contact with the oxygen of the air. It contains 11 per cent. of nitrogen. Its alcoholic solution is red, and gives an absorption-band at F.

*Uromelanin* has the composition  $C_{36}H_{43}N_7O_{10}$ , and is insoluble in alcohol or ether, but dissolves in dilute solutions of the alkalis, from which it is precipitated by acids. With silver, barium, calcium, lead, and zinc it forms basic and acid salts. The silver salt has the composition  $C_{38}H_{40}AgN_7O_9$ . *Uromelanin* is a very stable substance; the quantity excreted by an adult is 0.3 to 0.5 gram per day.

Neither urochrome nor any of the other products can be obtained crystallized. *Urochrome* is an alkaloid, the function of which is as yet unknown. The products of its decomposition are not related to the coloring matters of the blood or of the bile.

If the filtrate from the urochrome iron precipitate is concentrated, it yields bulky crystals which may be purified by recrystallization from alcohol. These consist of an alkaloid, *uro-theobromine*, isomeric with ordinary theobromine. It sublimes without change, forms no crystalline precipitate with silver nitrate, and displaces acetic acid from cupric acetate, forming an insoluble compound.

*Creatinine* is also present, and the mother-liquor from the creatinine contains three alkaloids. *Reducine*,  $C_{12}H_{28}N_6O_9$  or  $C_6H_{11}N_3O_4$ , forms a barium compound which is almost insoluble in alcohol. Neutral or acid solutions of *reducine* reduce ferric, cupric, or mercuric salts to ferrous, cuprous, or mercurous salts respectively, and silver salts to metallic silver. *Para-reducine* unites with zinc oxide to form a compound,  $C_6H_9N_3O \cdot ZnO$  or  $C_6H_9ZnN_3O_2$ . *Aromine* could not be isolated in a pure condition. When heated, it gives off an aromatic odor resembling that obtained from tyrosine under similar conditions.

**Toxicity of the Exhaled Air.**—At the *Soc. de Biologie* (*Brit. Med. Jour.*), M. M. Brown-Sequard and d'Arisonval reported on some recent experiments concerning the toxicity of the air exhaled from the lungs of man or of mammals. They assert, first, that the air exhaled nearly always contains ammonia; secondly, this air contains in very minute quantities, organic matter which, if not already putrefied on leaving the broncho-pulmonary passages, has a great tendency to rapid alteration, even at a low temperature; thirdly, confined air charged with pulmonary exhalations is extremely noxious, even when containing 1 per cent. of carbonic acid, with a corresponding diminution of oxygen.

## DETECTION OF ALKALOIDS AFTER DEATH.

BY DR. PELLACANI.

In a recent number of the *Rivista Sperimentale di Freniatria e di Medicina Legale*, Dr. Pellacani gives an account of some experiments which he made for the purpose of determining how long various poisonous substances resist putrefaction. It is obvious what an important bearing this question may have in medico-legal cases. The following was the method adopted:—A fixed quantity of the poison having been introduced into a definite quantity of blood, the mixture was allowed to putrefy under favorable conditions of temperature. From time to time it was tested for the poison, the same method being carefully employed in each case. Physiological tests were used in the case of such substances as atropine, physostigmine, curarine, etc., and in other cases methods giving characteristic reactions were employed.

The poisons experimented with were for the most part vegetable alkaloids, which were introduced in a free state in the following proportions relatively to the blood:—0·10 in the case of physostigmine, atropine, pilocarpine, daturine, and digitalin, and 0·50 in the case of all other substances.

In this way Dr. Pellacani found that no trace of digitalin or santonin could be found in the putrid liquid after four months, while atropine, daturine, and physostigmine took thirteen months to disappear; at the end of that time there was still a trace of codeine. Morphine and picrotoxin gave signs of their presence after twenty-seven months; aconitine and cicutine were still present in considerable quantities after thirty-four months, and veratrine was found at the end of thirty-nine months. As regards curarine it remained unaltered for twenty-eight months; but after thirty-nine months the physiological test gave a negative result, although the characteristic reaction still persisted, except with the sulphuric acid test. Dr. Pellacani considers that these experiments prove that putrefaction is not so rapidly destructive of vegetable poisons as has hitherto been believed. This is particularly the case with alkaloids.—*Brit. Med. Jour.*, July 21, 1888, p. 152; *med. chronicle, Sptb.*

To the foregoing abstract of Dr. Pellacani's paper may be added the results of researches on colchicine, by Dr. N. Obolonski (*Viertelj. f. ger. med.*, Jan. 1888), who found, that colchicine, when present in small quantities (5 mgrms. in 500 grms. of organic substance) can be

recognized with certainty. The alkaloid is of greater stability, and is not liable to decomposition even when mixed with organic substances in an advanced stage of putrefaction. The usual chemical processes for isolation do not produce any changes in the alkaloid. The best reagents for the detection of colchicine are—nitric acid, which gives a violet color, and a mixture of nitric and sulphuric acids, which give a green, changing to dark blue, violet, and yellow. Of these, nitric acid is the best.

#### A NEW CONSTITUENT OF LIVER OIL.<sup>1</sup>

BY H. MARPMANN.

The author states that by washing liver oil with 95 per cent. alcohol he has obtained a peculiar substance, which is easily soluble in water, and insoluble in alcohol, ether and benzene. According to the age and color liver oil dissolves more or less readily in alcohol; but even when sixty parts of alcohol are used to one part of oil a perfect solution is not obtained, there being always a residue of insoluble fat acids, which are dissolved by hot alcohol and by ether, but not by cold alcohol. As the substance in question is somewhat soluble in hot alcohol, the last traces of the insoluble compounds were washed out by means of cold alcohol, and the material worked upon was not the solution of oil in alcohol but the portion washed out of it on account of its insolubility.

This insoluble residue after repeated shaking with alcohol, was mixed with water and filtered. The portion soluble in water was, however, so small that the author is only able at present to give the general reactions of the aqueous solution. It had a faintly acid reaction, rotated polarized light to the left, gave with lead acetate and with tannic acid a slight turbidity, and was not altered by potassium ferrocyanide. A dilute solution gave with ferric chloride no reaction, but a concentrated solution assumed with it a dark yellow color, which upon boiling became blood red, and again yellow upon cooling. The solution upon boiling was not changed by strong nitric acid, ammonia, or potassium hydrate. On the other hand it reduced alkaline copper solution. Upon mixing the solution with orcin and hydrochloric acid in a porcelain dish, and evaporating on a water-bath to dryness there re-

<sup>1</sup>From the *Pharmaceutische Centralhalle*, August 23, reprinted from *Phar. Jour. and Trans.*, Oct. 13, p. 288.

mained a brown residue, having a metallic lustre. This dissolved in alcohol with a dark brown color, and the solution was colored gray-brown by ammonia. By this last reaction this constituent of liver oil soluble in water is distinguished from varieties of gum, since gum gives with orcin a green residue, that dissolves in alcohol with a greenish-yellow color, and this solution when treated with ammonia is colored yellow, with a tinge of greenish violet.

According to the rotatory power of the new substance and its behavior, towards Fehling's solution it might have been supposed to be gum, or an albuminoid or a sugar. For its qualitative distinction from any of these compounds the author found the orcin test most suitable, and he therefore describes the reaction somewhat in detail.

Orcin is the chromogen of various coloring matters, and is obtained from species of *Roecella* and *Variolaria* by boiling with milk of lime, and extraction of the neutralized and evaporated filtrate with alcohol from which it crystallizes out in colorless crystals. The orcin is freely soluble in water, and is readily altered on the addition of hydrochloric acid. Upon evaporating such a solution on a water-bath the residue is of a beautiful red color; this residue dissolves in alcohol with a rose color, which is changed to a very beautiful violet upon the addition of a few drops of ammonia solution. Small quantities of organic substances modify these color reactions very considerably, so that orcin constitutes an important reagent for such bodies, especially for carbohydrates.

Constant colorations are also obtained upon boiling a dilute solution of a carbohydrate with an equal volume of hydrochloric acid and about one per cent. of orcin, and afterwards adding alcohol and ammonia. But these reactions do not take place so smoothly as those obtained when evaporation is practised.

The author prepared a solution of one gram of orcin in 100 cc. of pure hydrochloric acid, of which he placed about 0.5 cc. upon a porcelain dish, then added about an equal quantity of the substance to be tested, and evaporated upon a water-bath. As soon as this small quantity of liquid became warm the color reaction began, the evaporated layer becoming colored at the margin. When it was dry alcohol was added, which dissolved the residue more or less completely. This alcoholic solution had a constant color for each substance, which upon the addition of a few drops of ammonia solution was altered more or less. Strong oxidizing agents, such as nitric acid, give very strong

colorations with orcin, on which account such additions are to be avoided.

In the following table the color reactions of orcin with various substances tested are described:—

	Evaporation residue.	Solution in Alcohol.	Addition of Ammonia.
Gum Arabic.....	Green	Green-yellow	Green-yellow violet.
Gum Tragacanth.....	Green-black	Green-yellow	Brown.
Gum Senegal.....	Greenish-blue	Green-yellow	Green-yellow.
Potato Starch.....	Red	Light-brown	Violet-yellow.
Maranta Starch.....	Red	Brown	Brown.
Triticum Starch.....	Yellow-red	Light-brown	Brown.
Milk Sugar.....	Brown-red	Yellow-brown	Greenish-brown.
Beet Sugar.....	Brown	Yellow-brown	Brown.
Cane Sugar.....	Brown	Yellow-brown	Brown.
Gelatin.....	Red	Yellow-red	Violet.
Pepsin.....	Yellow	Yellow	Dark-yellow.
Pancreatin.....	Brown	Light-brown	Rose-violet.
Albumen, fresh.....	Yellow-brown	Light-brown	Brown.
Albumen, boiled, dissolved in Pepsin.....	Yellow	Light-brown	Brown.
Albumen, boiled, dissolved in Pancreatin.....	Brown	Light-brown	Brown-violet.
Residue from alcoholic solution of Liver Oil.....	Brown	Light-brown	Brown green.
Pure Orcin.....	Red	Rose	Violet.

According to this comparison the residue from liver oil showed most resemblance to pancreatin and albumen that had been dissolved by pancreatin. This suggested the idea of seeking the new substance in fresh pancreatic liquor.

Fresh aqueous pressings from pancreas glands were precipitated with alcohol, the precipitate washed with alcohol, then dissolved in water, and again precipitated, washed and redissolved in water. The resulting solution rotated a polarized ray to the left and reduced alkaline copper solution. By evaporating over sulphuric acid a non-crystalline residue was obtained. It was therefore considered probable that the two substances from liver oil and pancreatic juice were identical, and this assumption was made tolerably certain by a comparison of the influence of the two substances upon fixed oils. A few cubic centimetres of the solutions mixed with any of the fatty oils acted so that the oil could be temporarily emulsified with half its volume of

water, and after several hours the oil did not separate pure, but with a somewhat milky turbidity.

The author states that he has found this new substance in all the samples of liver oil examined, both in the white oils and in the darkest varieties, from the most diverse commercial sources. He thinks it might be present in fresh livers in larger quantity, since liver oils deposit a quantity of mucus upon standing. But at present he has not examined any perfectly fresh oils and cannot therefore speak with certainty upon this point.

#### LARD ADULTERATION WITH COTTON-SEED OIL.

The September number of the "Analyst" contains communications on the above subject by A. H. Allen, Otto Hehner, Rowland Williams, E. W. T. Jones, W. F. K. Stock and Prof. J. Campbell Brown, which are condensed into one article in the following. As they do not agree as to the value of the various tests, under each test is given the mode of procedure followed by its advocate.

1. *Saponification equivalent*, owing to the nearly alike value of lard and cotton-seed oil, is of little use, except in occasional cases, to denote the presence of other adulterants, as cocoanut oil, said to be sometimes used.

2. Melting-point is no criterion as to its freedom from adulteration, depending on the part or parts from which the fat is obtained.

3. *Specific gravity* allows of no very definite conclusions, but is of value in case beef stearin is present with the cotton-seed oil. Lard has the sp. gr. 0.861, beef stearin 0.862, and cotton-seed oil 0.872, at 100°C.

4. *Sulphur monochloride*,  $S_2Cl_2$ , 5 gm. melted lard are put in a small porcelain dish, and just before setting 2 cc. of a mixture of equal volumes of  $S_2Cl_2$  and  $CS_2$  added, the mixture well stirred at first, and then occasionally, for the first fifteen minutes, without application of heat. Genuine lard only *thickens*, or perhaps becomes *rather stiff*, in three hours, an appreciable amount of cotton-seed oil will cause it to become *hard and solid* in half this time. This test is very simple, but with practice one can with a certainty pick out all lards containing cotton-seed oil.

5. Salkowski has shown that animal fats contain a small quantity

of cholesterin, and that vegetable fats contain phytosterin. Fifty gm. of fat is saponified with alcoholic potash, the soap well shaken out with ether, the ether distilled off, the residue once more treated with alcoholic potash and ether, and the residue dissolved on a watch-glass in a few drops of hot alcohol. The long needles of phytosterin obtained in the presence of a vegetable fat melt at 132°C., and treated with chloroform and sulphuric acid form a bluish solution. Cholesterin crystallizes in flat tablets, melts at 146°, and with the above test gives a red solution. The difference of color is strongly marked if the solution is allowed to stand in a corked test tube for several days.

6. *Maumené's test.*—Used as a quantitative test but to succeed the lard must first be entirely deprived of moisture by heating over a Bunsen burner. 50 gm. of pure lard with 10 cc. strong sulphuric acid, show a rise of from 24 to 27.5°C.; cotton-seed oil of about 70°C. In every case a lard which reduces silver shows a rise higher than 27.5°, the increase being proportional to quantity of cotton-seed oil.

7. *Iodine-absorption.*—A reliable test in the absence of stearin, which is added to lard heavily adulterated with cotton-seed oil, to counteract the softening effect of the latter. Stearin absorbs much less iodine than cotton-seed oil, therefore the addition of a large percentage of stearin reduces the iodine absorption of the mixture to a greater or less extent; it is rarely, however, that the stearin is present in such quantity as to absolutely nullify the test. American lard absorbs from 60–62 per cent. iodine; English lard appears to absorb less—from 51.5 to 62 per cent.; beef stearin, 21 per cent.; lard oil, fresh, 73–74 per cent.; old lard oil, believed to be pure, 41 per cent.; cotton-seed oil, 105–110 per cent. Some lards examined absorbed as much as 85 per cent., while numerous samples required 70–75 per cent., leaving no doubt of their adulteration with cotton-seed oil.

Weigh about 0.5 gm. of the melted lard into a three-ounce wide-mouthed stoppered bottle, melt the fat by placing the bottle on a water-oven, and when *nearly cool* dissolve the fat by adding 10 cc. chloroform, 20 cc. Hübl's reagent (5 gm. I and 6 gm.  $HgCl_2$  are each dissolved in 100 cc. 96 per cent. alcohol, the solutions mixed and allowed to stand over night before use) are carefully measured into the bottle after it has become quite cold, and set aside for three hours; at the end of this time the color must be decidedly brown, showing excess of iodine, or else the operation must be repeated, using less fat.

The contents of the bottle are poured into a beaker, the bottle is rinsed with potassium iodide solution, and the liquid titrated with  $\frac{1}{10}$  normal sodium hyposulphite, which has been standardized with pure iodine just before use. The Hübl's reagent must also be standardized for each set of experiments, and to offset the reducing action of chloroform upon the iodine solution, a quantity equal to that used in the test must be added in standardizing. There is a practical advantage in determining the iodine absorption of the fatty acids instead of the fat, in that the use of chloroform can be dispensed with, owing to the solubility of the fatty acids in alcohol. The fatty acids are best prepared by saponifying the fat with rectified spirit and the saturated aqueous solution of caustic soda, recommended by Wollny for use in Reichert's butter process.

8. *Silver nitrate test.*—This test is considered by all to be characteristic for cotton-seed oil; in its execution various methods are employed. I. Bechi's test<sup>1</sup> contains an amylic alcohol solution of rape oil, which it has been shown can be dispensed with without impairing the delicacy of the test. The simplified reagent is a solution of 1 gm. silver nitrate in 200 gm. alcohol and 40 gm. ether, acidifying by addition of 0.1 nitric acid. To the oil or fat to be examined add half its bulk of the above solution and heat in a water-bath for fifteen minutes. Pure lards always remain perfectly unchanged, cotton-seed oil mixtures blacken more or less quickly. II. Milliau's<sup>2</sup> modification of the above. III. Stock's process is based on that of Milliau. 15 gm. of the sample are saponified in a 7-inch capsule with a mixture of 15 cc. of a 30 per cent. NaOH solution, and 15 cc. 92 per cent. alcohol by heating the fat to 110° C. and adding the mixture, 1 cc. at a time, with constant stirring. The temperature should not fall below 95° C.; if the operation has been successful, the soap is a smooth, thick paste. Boiling distilled water is added slowly at first until the paste is thinned, then water is added to make 500 cc., in which volume the soap should dissolve completely. 40 cc. dilute H<sub>4</sub> SO<sub>4</sub> (1-10) are added and the liquid brought to a boil for 7 to 12 minutes, then kept just below boiling, until the separated fatty acids fuse to a clear, oily layer from which the greater part of the aqueous layer is removed by siphonage; the remainder with the fatty acids is poured into a clean, warm flask with a long and narrow neck. The acids are freed as

<sup>1</sup> AMERICAN JOURNAL OF PHARMACY, 1887, 280.

<sup>2</sup> AMERICAN JOURNAL OF PHARMACY, 1888, 290.

nearly as possible from the watery layer which is syphoned off, and the flask filled up with boiling distilled water so as to bring the acids into the neck.

5 cc. of the fused, fatty acids are now transferred into a clean, dry, wide test tube by means of a dry, warm, fast-running pipette, 20 cc. absolute alcohol added by pouring through the pipette so as to wash it, the solution heated to incipient ebullition in a vessel of boiling water, and 2 cc. of a 30 per cent. solution of silver nitrate added, when if even 2 per cent. of cotton-seed oil be present in the sample, the characteristic cedar-brown color is at once developed. To quantify this reaction, known mixtures of pure lard and refined cotton-seed oil are treated as above, and the colors in the different tubes compared by reflected light against a white back-ground. This must be done simultaneously, for in about seven minutes the coloring matter begins to fall out, and correct comparison is then impossible.

In this test a blank experiment should be made as "pure" alcohol often reduces silver nitrate to a certain extent.

The following table shows some of the results obtained:

	Omentum Lard, Pure.	Leaf Lard.	English Lard.	American Lard con- taining cotton-seed oil.	Mixture of unknown nature.	Suspected sample.
Original Fat.	Melting point; °C.	39	40	39	37.5	40
	Solidifying point; °C.....	{ 26.5 rising to 27.5	32	27	27.5	30.5
	Plummet gravity at 90 °C.....	.8602	.8620	.8608	.8648	.8637
	Iodine absorption per cent.....	55.4	60.5	62	82.5	68.8
	Melting point; °C.	39	39.5	.....	.....	39.5
	Solidifying point; °C.....	{ 38.7 rising to 39.0	{ 38.5 rising to 38.8	.....	.....	{ 37.5 rising to 38.5
	Plummet gravity at 90 °C.....	.8372	.8385	.....	.....	.8450
	Mean combining weight.....	274.5	.....	.....	.....	276.8
	Iodine-absorption per cent.....	58.3	65.3	.....	.....	70.4
	Oleic acid, etc., per cent.....	58.4	.....	.....	.....	57.8
Fatty Acids.	Oleic acid, Iodine- absorption.....	87.4	.....	.....	.....	64.8
	Millian's nitrate of silver test.....	White.	White.	Grey.	Marked black'ng.	(94.6) Marked blackening
						Sensible darkening

The following figures are the recorded results of experience with 1 tallow, 2 lard, 3 and 4 cotton-seed oil, 5 fatty acids from 4 and 6 cotton-seed fat, a commercial product which is the *stearin* of cotton-seed

oil, the *ordinary* cotton-seed stearin of commerce is the stearic acid from cotton-seed oil.

	1 Tallow.	2 Lard.	3 Cotton-	4 seed oil.	5 Fatty acids from 4.	6 Cotton- seed fat.
Original fat.	Melting point; °C.....	{ 28 45			35	40
	Solidifying point; °C.....	{ 48			32	31 rising to 32.5
	Plummet gravity at 99°C.....	{ .862 .860 .861	105	.8725	.8476	.8884
	Iodineabsorption, per cent.	{ 40 59 62	110	{ 108 110	{ 115.8 285	89.8
	Saponification equivalent .....			{ 294	{ 289	.....
	Acidity (- oleic acid).....			trace	97.6	34
	Melting point; °C.....	45	38	{ 35 36	.....	.....
	Solidifying point; °C.....	48	38	30	.....	.....
	Plummet gravity at 99°C.....			.8467	.....	.....
Fatty acids.	Iodine absorption, per cent.	41.3	64.2	115.7	.....	.....

Lard differs materially in its iodine-absorption from beef-stearin on the one side and cotton-seed oil on the other. There is also a marked difference in the specific gravity of lard and cotton-seed oil, and this difference is also noticeable in the fatty acids. On the other hand, lard and beef-fat are substantially of the same density. This difference is very important, as it would enable one to distinguish a mixture of beef-stearin and cotton-seed oil having an iodine-absorption of about 60, from genuine lard. Thus, while the proportion of the adulterant in a mixture composed of *lard and cotton-seed oil only* can be ascertained with considerable accuracy by determining the iodine-absorption, the estimation will be below the truth if beef-stearin be present. On the other hand, the presence of beef-stearin does not interfere with the deduction to be drawn from the increased specific gravity of the melted sample. Hence this method, though not affording more than approximate results, is calculated to do very good service in conjunction with the iodine-absorption.

Analysts are cautioned by J. Campbell Brown against two errors they are liable to make in trusting the iodine-absorptions published.

1. Liability to underestimate the proportion of cotton-seed oil and other foreign fats in adulterated lard. The substance used by about twenty-five American firms is a mixture of cotton-seed oil and beef-stearin, the residue from the manufacture of oleo-margarine. The iodine-absorption of any mixture that can be used for mixing in large proportions with lard is much lower than that of cotton-seed oil—not

higher, if so high, as between 80 and 90. Now if any one calculates the quantity of cotton-seed oil in mixed lard giving an iodine-absorption of say 76, using 105 as the iodine-absorption of the foreign fat, instead of 90 or under, it is clear that he will greatly under-estimate the quantity of the foreign fat.

2. Liability to condemn genuine lard which is more oily than pork fat or lard rendered in England.

American lard contains as a rule naturally much more olein than English lard. If some of the lard oil has not been pressed out the high iodine-absorption of lard oil—75 to 80—so raises the iodine-absorption of the thin oily lard, that an analyst judging mainly from the iodine-absorption would infer the presence of cotton-seed oil where there was only an excess of lard oil. It is necessary, therefore, to be very careful in determining, first the presence of some cotton-seed oil by safe qualitative tests before determining the iodine-absorption; and, further to take into consideration the consistence of the sample and to attend to tests for beef-stearin.

*Allied Notes.*—Mr. Fox recently found fifty per cent. of earth-nut oil in lard oil, detecting it by the altered sp. gr. and the presence of *arachidic acid*.

Bechi's test can be used to detect the presence of margarin which almost invariably contains cotton-seed oil, in butter which, if pure, will not reduce the silver solution.

F. X. MOERK.

### ON GUAIACOL.

BY D. J. LEECH.

CREASOTE is a composite substance containing various constituents, of which guaiacol, or catechol (pyrocatechin) monomethyl ether  $C_6H_4\left\{\begin{array}{l} OH \\ OCH_3 \end{array}\right.$  is the most important, 60 to 90 per cent. of beech wood creasote consisting of this ether. The specimens of creasote sold for medicinal purposes are by no means uniform as regards their composition, and, not unfrequently, so-called creasote consists chiefly of carboxylic acid.

Guaiacol is a highly refractive colorless liquid, with an aromatic smell, slightly soluble in water, readily so in alcohol and fixed oils. The statements made by Sommerbrodt and Fraenkel as to the benefits derived from the administration of creasote in phthisis, led Sahli to try

guaiacol, which has advantages over creasote in that it is of definite composition, and has a less unpleasant taste and odor. Sahli prescribed it thus:—

R. Guaiacol puriss .....	15 to 30 minimis.
Aq. destill.....	6 ounces.
Sp. vin. rect..	6 drachms.

A teaspoonful to a tablespoonful, two to three times a day after food, in some water.

The solution should be kept in a colored bottle, as exposure to light causes the deposition of a resinous substance.

H. Sahli (*Cor.-Bl. f. Schweiz. Aerzte*, 1887, XVII., 616, 622,) likewise administered the guaiacol in cod liver oil. He found it improve appetite, loosen and diminish expectoration, besides ameliorating general discomfort and relieving pain.

M. Schüller (*Wien. med. Presse*, 1887, No. 50,) caused his phthisical patients to inhale the vapor of a watery solution of guaiacol, and gave, in addition, extract of guaiacum wood in pills. He states that his patients improved under this treatment.

Fraentzel (*Deutsche med. Woch.*, 1888, No. 7, p. 138) has used guaiacol in more than a dozen cases. He considers it the active constituent of creasote, and recommends the following formula:

R. Guaiacol.....	3½ dr.
Tr. gent.....	1 oz.
Sp. vin. rect.....	8 oz.
Vin. Xericq. s. ad O i.	

One tablespoonful, two or three times daily, in a wineglassful of water. He strongly advocates its use.

J. Horner (*Prag. med. Woch.*, 1888, No. 17) says he has employed guaiacol for four years at the General Hospital at Zwickau in the treatment of tuberculosis. He gives it in pills containing about three-fourths of a minim, commencing with one thrice daily after food, and gradually increasing the number of pills to ten in a day. Under this treatment, combined with careful diet and hygienic precautions, he thinks he has seen complete cures of cases of phthisis when far advanced, and improvement even in those of long standing. In many cases the appetite improves, the bacilli decrease, the cough and fever and expectoration diminish; night sweats disappear, and the patients improve in strength. In some cases no distinct effect follows, but the drug never produces any untoward results. Most patients take it very well, and only a few object to it.—*Med. Chronicle*, Sptb., 1888.

## PHARBITIS TRILOBA AS A SOURCE OF "JALAP."

In the second part of Vol. I of the "Mitteilungen aus der medicinischen Facultät der kaiserlich Japanischen Universität," published at Tokio, M. K. Hyrano discusses the value of this species, a native of Japan, for medicinal purposes. He states that the purgative properties of the official species of convolvulaceæ are due to the presence either of convolvulin  $C_{31}H_{50}O_{16}$  or of orizabin  $C_{34}H_{56}O_{16}$  (jalapin of W. Meyer). The drugs used in commerce are jalap root, orizaba root, scammony root and turbit root. Jalap root contains convolvulin, but that of *Ipomoea Orizabensis* jalapin, which has a homologous composition with convolvulin, but differs from it by its solubility in ether and chloroform. Scammony root also contains orizabin; the resin contained in turbit root appears to consist at least partially of the same substance as that of orizaba root. The purgative properties of the seeds of *Pharbitis Nil* are due to convolvulin. The native name of *Pharbitis triloba*, of Japan, is "asagawo," and its seeds have long been used as a purgative under the name "kengashi."

A full botanical description of the plant and, in particular, of the seeds, follows.

To extract the active principle, 400 grams of the finely-powdered seeds were twice boiled in alcohol of 90 per cent., filtered, and the pure filtrate decomposed by acetate of lead. The liquid filtered from the lead precipitate, after removing the excess of lead by sulphuretted hydrogen, was evaporated in the water-bath, by which a resinous mass was obtained. This was kneaded in warm water in order to rid the resin from its soluble impurities; and it was further purified by again dissolving in alcohol and precipitating by water. The resin thus finally obtained in the water-bath weighed 27 grams. It was a brittle friable substance; ether extracted from it 10·3 per cent. of almost pure oil. The portion remaining insoluble in ether gave all the reactions of convolvulin. The pure resin was easily soluble in alcohol, but insoluble in bisulphide of carbon or chloroform; after treatment with dilute hydrochloric acid it reduced alkaline copper solution. Like convolvulin, it exhibited the chemical properties of a glucoside, splitting up, under the action of mineral acids, into sugar and convolvulionic acid  $C_{13}H_{23}O_3$ , which forms a crystallizable salt with barium, soluble with difficulty in water, but readily in alcohol.

The author concludes that the resin obtained from *Pharbitis triloba* may be used officially in the place of resina jalapæ.—*Phar. Jour. and Trans.*, October 6, p. 270.

## ON THE ACTION OF THE ROOT OF APOCYNUM CANNABINUM.

By DMITRY A. SOKOLOFF.

The North American plant *Apocynum cannabinum* belongs to the natural family *Apocynaceæ*, which has already supplied us with a series of cardiac poisons and powerful remedies (*Strophanthus hispidus*, *Tanacetum venenifera*, *Vinca major*, *Thevetia neriifolia*, *Nerium Oleander*, etc.). While the apocynum root is official in the United States of America, it remains still very little known in the Old World. In view of this circumstance, Dr. Sokoloff has undertaken an experimental enquiry into the biological action of the drug in Professor S. P. Botkin's clinical laboratory in St. Petersburg. The experiments consisted in the intravenous injection of an aqueous infusion of the root (eight grammes to 100 cc. of water) into various warm-blooded animals, the single dose of the infusion varying from three to ten cubic centimetres. The chief outcome of Sokoloff's researches may be condensed thus:—

- (1) The drug produces a very pronounced retardation of the cardiac action, with a very considerable enlargement of the pulse wave and a marked rise of the blood tension.
- (2) The initial retardation of the heart is followed by an acceleration of the cardiac action, while the arterial pressure ascends still further.
- (3) The cardiac retardation (first stage) is caused by an irritating action of the drug, both on the central and peripheral inhibitory apparatuses.
- (4) The subsequent acceleration (second stage) is not dependent upon anything like paralysis of the inhibitory apparatuses, since the injection of another dose of the infusion can again give rise to a retardation of the heart's work.
- (5) On the injection of a very large dose, the two stages are followed by a third one, which is characterized by cardiac arrhythmia, the appearance of Traube's waves, and a gradual fall of the blood pressure down to 0.
- (6) The rise of the blood tension during the first and second stages is dependent not only upon the stimulation of the vaso-motor centres in the medulla oblongata, but also (and that in a very considerable degree) upon the excitation of the spinal vaso-motor centres.

Moreover, the heart and blood vessels themselves take a certain active part in the causation of the rise.

(7) Both the central and peripheral vaso-dilatory apparatuses remain wholly intact.—*Med. Chronicle, Sptb.*, 1888; *from Ejened. Klin. Gaz.*, 1888, Nos. 25, 26.

## FREEZING MIXTURES CONTAINING SOLID CARBONIC ANHYDRIDE.<sup>1</sup>

BY L. CAILLETET AND E. COLARDEAU.

The temperatures were measured by means of a thermoelectric couple which had been graduated against a hydrogen thermometer.

Compressed or porous solid carbonic anhydride alone, under atmospheric pressure, gives a temperature of about  $-60^{\circ}$ ; in a vacuum maintained by means of a pump and potash the temperature is  $-76^{\circ}$ . A mixture of ether and solid carbonic anhydride has a temperature of  $-77^{\circ}$  under ordinary pressure, and  $-103^{\circ}$  in a vacuum. This mixture solidifies liquid carbonic anhydride.

When solid carbonic anhydride is added to ether, it at first disappears rapidly, not owing to volatilization, but because it dissolves in the ether. The ether remains transparent, but after some time bubbles of gaseous carbonic anhydride are given off. If further quantities of the anhydride are added, the liquid becomes saturated, and loses its transparency. The temperature gradually falls until it attains a minimum exactly at the point of saturation. Any further addition of the anhydride causes no further reduction of temperature, but the liquid becomes more and more turbid. It is evident that the effect of the ether is due to its solvent action on the carbonic anhydride. Other solvents producing low temperature with the anhydride are methyl chloride,  $-82^{\circ}$ ; sulphurous anhydride,  $-82^{\circ}$ ; amyl acetate,  $-78^{\circ}$ ; phosphorus trichloride,  $-76^{\circ}$ ; alcohol,  $-72^{\circ}$ ; and ethylene chloride,  $-60^{\circ}$ . The temperature of mixtures of carbonic anhydride with methyl chloride or sulphurous anhydride in a vacuum is so low that the solvent solidifies, and the temperature of the mass remains constant from this point. With methyl chloride the temperature obtained is  $-106^{\circ}$ . A mixture of carbonic anhydride and chloroform becomes solid under ordinary pressure, and has a temperature of  $-77^{\circ}$ .

<sup>1</sup> *Compt. Rend.*, evi, 1831—1834; reprinted from *Jour. Chem. Soc.*, October, p. 1025.

SOLUBILITY OF MAGNESIUM AMMONIUM PHOSPHATE IN ALCOHOL.<sup>1</sup>

BY A. J. WAKEMANN.

The author mentions that Rose, in the sixth edition of his *Handbuch der Analytischen Chemie*, points out that the precipitate of magnesium ammonium phosphate is entirely insoluble in water containing one-fourth of its bulk of ammonia solution of specific gravity 0.96, and that under the determination of phosphoric acid by magnesium salts, Rose states that water containing 3 per cent. of ammonia gas dissolves only traces of the precipitate, and that this solubility is reduced to less than half if to the dilute solution of ammonia one-fourth of its volume of alcohol is added, and, further, that the addition of alcohol favors the separation of the precipitate.

The author, in order to test the method, which he says appears to have been neglected by analysts, has made a series of comparative analyses under identical conditions with the exception that some of the precipitates were washed with ammonia solution, according to the ordinary method, and the remainder with ammonia solution containing alcohol.

The results of his experiments point to a slight advantage in the use of alcohol in diminishing the solubility of magnesium ammonium phosphate when the precipitate is somewhat bulky. The use of alcohol, moreover, appears to make the precipitate more compact, so that it is more easily washed, and is less liable to creep up the sides of the funnel. The addition of alcohol to the solution in which the precipitation takes place is not advantageous, as it causes the precipitate to attach itself more closely to the beaker, so as to be difficult of removal, and it also retards the filtration.

## VARIETIES.

*Caustic Pencils* are made by De Sinéty (*L'Union méd.*, March 17) of crystallized phenol 0.05, tannin 4.0, glycerin 5 drops, and sufficient tragacanth.

*Unguentum Calcii chloridi*, prepared as follows, is used by Dr. Lier (*Monatsh. f. pr. Derm.*) in eczema: Ung. zinci 20, talc. 5, ol. cadinum 5, calcii chloridum 2, and water 10 gm.

<sup>1</sup> *Technology Quarterly*, Boston, i, 173—177; reprinted from *Jour. Chem. Soc.*, October, p. 1131.

*Silicofluoride of sodium as an antiseptic.*—After an extensive and varied trial of *salufer*, Dr. Robson (*Brit. Med. Jour.*, May 19), has arrived at the following conclusions:

1. "Salufer" is an efficient antiseptic.
2. The powder is a strong irritant, even acting as a caustic if dusted on a raw surface.
3. A solution of one grain to an ounce of water is quite strong enough for ordinary purposes, being apparently unirritating in that strength.
4. A solution of ten to twenty grains to a pint (imperial), may be safely used to syringe out closed cavities.
5. The solution is unirritating to the hands.
6. The solution acts on the glaze of porcelain after long use, and corrodes steel instruments, but sponges are unaffected by it. The addition of bicarbonate of sodium to the solution of "salufer" diminishes its action on steel.
7. A very convenient and comfortable antiseptic poultice may be made by soaking Gamgee tissue or absorbent wool in a hot solution (ten grains to the pint), wringing it free of excessive moisture, applying it to a wound, and covering with gutta-percha tissue.
8. Although for ordinary surgical work he will still employ perchloride of mercury, in all cases where there is danger of absorption, as in syringing out cavities, he will employ "salufer."
9. "Salufer" will prove to be of great use to obstetricians, it being both safe and efficient.
10. It acts very efficiently as a deodoriser to the hands.

*Amylene Hydrate.*—Dr. Lares (*Med. News; Berl. klin. Woch.*, May 21, 1888), presents the following conclusions:

1. Amylene hydrate is a very useful hypnotic, which may be given in two or three times as large a dose as chloral hydrate.
2. It operates somewhat less certainly than chloral hydrate and morphine.
3. Unpleasant accidents (excitement, slight drunken-like stupor) were very seldom observed. Grave accidents were never observed.
4. A tolerance, relative to diminution in efficiency, was not noticed within three months.
5. The deep and refreshing nature of the sleep obtained was praised oftener than in the case of any other sleep-producing means.

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## MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, OCTOBER 16, 1888.

The first meeting of the present series of meetings was held this day, and was organized by calling Mr. Wm. B. Webb to the chair. The minutes of the last meeting having been published in the AMERICAN JOURNAL OF PHARMACY, it was moved that the reading of them be dispensed with.

The actuary reported that Mrs. Mary Wayne had presented quite a number of valuable books which formed part of the library of the late Prof. E. S. Wayne, and that he had returned the thanks of the College for her kind consideration. On motion of the curator the thanks of the College were also voted to Messrs. Hance Brothers & White, for a collection of powdered extracts presented to the museum of the College.

Mr. Joseph W. England, Ph.G., read a paper upon permanent *syrup of iodide of iron*. Prof. Maisch stated that honey was originally suggested for the preservation of iodide of iron, and that the solution of ferrous iodide as prepared many years ago, was protected by honey. Mr. Webb said that it was so when he commenced learning the drug business. Prof. Maisch stated this agreed with the proposal of Mr. England, as honey consists in part of glucose. Before the theoretical suggestions of the paper were accepted, they should at least in part be verified by experiment and analysis. He had always found the precipitate occurring in the syrup, to retain some iodine even after prolonged washing, and the aqueous solution of ferrous iodide he thought had an acid reaction. Mr. England said he had not tested it before the addition of the sugar. Mr. Beringer said that he had seen some samples of syrupy glucose which were very acid from sulphurous acid used in decolorizing it, and that some of these samples were so strongly contaminated that the character of the acid was easily recognized by its odor.

Mr. Beringer read a paper upon an adulteration of *ground elm bark*; the bark was thought to be of western production. Both of these papers were referred to the publication committee.

Mr. Moerk read some extracts from a paper by a German apothecary, M. Marpmann, upon *fat absorptions and a new substitute for cod liver oil*; the statement that cod liver oil owes its therapeutic value to the presence of free fatty acids has been frequently made and it has been noticed that the pale or bleached oils are less tolerated than those having a yellow or light brown color. The quantity of free acid calculated as oleic acid varies from .2 to 4 per cent.; lard, when fresh, varies from 1 to 1.52 per cent., and old lard contains at times as much as 6 per cent. All the facts make it quite unlikely that the assimilation is in ratio to the acids present, and the chemical conditions and physiological considerations render it quite improbable. The pancreatic ferment decomposes the fats and the bile emulsifies the acids as such or after combination with bases, which then are in this condition assimilated. Chemical changes do not take place in the fatty acids when fats are decomposed; the acids are deposited as such and there is no reason why an acid fat should exhibit different reactions under pancreatic ferments to those shown by a neutral fat. The rapidity of the change seems to be owing to the potency of the fermenting principle; and it has never yet been shown why cod liver oil is more medicinally active than other oils. Fluid fats seem to cause more difficulty in digestion than solid ones and it is probably because they coat the food with a layer that is impenetrable to the gastric juice, and some fats cause less disturbance to the functions of the stomach and are consequently easier of digestion.

Artificial gastric juice when digested with different oils shows quite dissimilar results. With cod liver oil it gives a transient mixture, then separates into an emulsified fat layer, and only becomes clear through half its volume. The oils of olive, rape, flaxseed, ground nut, hemp, poppy, and benne, when similarly treated, separated at once, and castor oil emulsified slightly—and all the oils gave a slightly acid reaction after twenty-four hours and traces of glycerin were observable in the aqueous solution. It would seem as the sum of these experiments that cod liver oil differs from the other fats because of its easy miscibility with the gastric juice, and then the pancreatic secretion can act on the finely divided mixture, while other fats remain in large globules and are not easily acted on.

Two preparations have been proposed to be substituted for and improvements on cod liver oil.

*Lipanin*, which is olive oil with a small percentage of free oleic acid.

*Fat peptonate*, a mixture of cod liver oil, or pure olive oil acted on by the pancreatic secretion.

Four other preparations were made to compare results with lipanin, viz.: Olive oil with 5 per cent. of pure phosphoric acid; olive oil with 5 per cent. lanolin; olive oil with  $\frac{1}{2}$  per cent. sodium oleate; and olive oil with 1 per cent. mucilage of gum arabic.

Lipanin when treated with artificial gastric juice mixes fairly at first, but separates in a few minutes nearly pure. Fat peptonate, under same treatment mixes, and after 24 hours still is free from oil globules; olive oil with half per cent. oleate of sodium is the only other one that remains mixed; the inference from all these experiments is that pure fluid fats should be avoided, and that natural foods in which the fats are divided should be the type of such remedies.

The reading of these extracts elicited remarks from several present. Mr. England said that a French house was making a preparation called morrhuol, to be used as substitute for the pure oil; and Dr. Lowe said that in the French hospitals the oil was given with the food in place of butter.

Mr. Brown said that he had lately examined *gum arabic* which proved to be adulterated with dextrin, and *lycopodium* that was mixed with at least fifty per cent. corn starch.

Mr. Boring stated that at a meeting of the State Pharmaceutical Association held in June 1887, Mr. England read a paper on a *solution of carmine* suitable for coloring purposes in pharmaceutical preparations; and that in making a similar preparation he found when he had evaporated it till a rod moistened with hydrochloric acid showed no ammoniacal vapor that the carmine was precipitated in globules through the solution, and thought that there was some fault in the process. Several members said that the cause of this precipitation of color was doubtless the destruction of the combination by removing too much ammonia and that more careful manipulation and a lower temperature in evaporation would obviate this trouble.

There being no further business, on motion the meeting adjourned.

T. S. WIEGAND, *Registrar.*

## PROCEEDINGS OF STATE PHARMACEUTICAL ASSOCIATIONS.

The *Dakota* (Northern District) *Pharmaceutical Association* held its annual meeting in Jamestown August 7th and 8th. Vice-president Siegfried presided. Mr. Allen welcomed the Association in an appropriate speech. Reports were received from the secretary, treasurer, and the several committees. Among the work inaugurated at this meeting is the revision of the territorial pharmacy law, for which purpose a committee was appointed charged with consulting with a similar committee of the South Dakota Association and with the Pharmacy Board, and with presenting to the next legislature suitable amendments to the law. The following officers were elected for the ensuing year: C. N. Valentine, La Moure, president; D. F. Siegfried, Sanborn, and C. P. Trepanier, Grand Forks, vice-presidents; H. L. Hausamen, Grafton, secretary, and E. C. Maxey, Fargo, treasurer. The next meeting will be held at Fargo, at a time to be named by the Executive Committee.

The *South Dakota Pharmaceutical Association* met in Huron, August 25th, President Branch in the chair, and was welcomed by Mayor Rice. Besides the president's address and the reports of other officers and committees, several papers claimed the attention of the meeting, the subjects being the use of powdered opium in the preparation of the tincture; the preparation of tinctures and wines from fluid extracts; the keeping of poisons; physicians dispensing vs. pharmacists prescribing; and the renewal of prescriptions. Amendments to the pharmacy law were discussed, and a committee was appointed to act in conjunction with a similar committee from the North Dakota Association. The officers elected are: W. S. Branch, Parker, president; C. Burch, Huron, and N. G. S. Marie, Frankfort, vice-presidents; I. A. Keith, Lake Preston, secretary; D. T. Dunning, Sioux Falls, treasurer, and B. F. Stearns, local secretary, for the next annual meeting, to be held at Aberdeen, on the third Tuesday of August, 1889.

The *Illinois Pharmaceutical Association* assembled in Peoria at its ninth annual meeting, August 21st to 23d; President H. Smith in the chair. Mayor Warner extended the hospitalities of the city. The president presented his annual address, and the secretary and treasurer their annual reports. Reports were also received and properly disposed of from the Board of Pharmacy and from the various committees. Regarding the report on the revision of the *Pharmacopœia* it was referred to a committee with the view of ascertaining, by means of a series of questions, the wishes of the pharmacists of the State. A resolution was passed requesting the Board of Pharmacy to rescind the rule requiring two years practical experience in the State before a person could become a candidate for examination; also another resolution in favor of examinations in practical dispensing.

A lengthy report on reorganization with the view of making every registered pharmacist of the State a member, and enlisting his personal participation in carrying out the objects of the Association and of the pharmacy law,

was discussed to a considerable extent, and adopted in its main features, the perfection of the details being referred to a committee consisting of one representative from each congressional district, and of the president, secretary and treasurer of the Association as ex-officio members.

The Board of Trustees of the Chicago College of Pharmacy tendered that college and its property to the State Association for future control and management. After considerable discussion the matter was referred to a special committee for consideration and report.

A number of papers on various subjects were presented and referred.

The officers for the present year are Henry Smith, Decatur, president; W. M. Benton, Peoria, F. C. J. Schackmann, Newton, and F. L. Shinkle, Martinsville, vice-presidents; L. C. Hogan, Englewood, secretary; C. A. Strathman, El Paso, treasurer, and J. O. Christie, local secretary for next year's meeting at Quincy, to be held on the second Tuesday of August.

At a meeting held in Chicago, October 22d and 23d, the special committee on the transfer of the Chicago College of Pharmacy reported to the executive committee; while recognizing the advantages which might be expected to result from the management, by the association, of the pharmaceutical educational institutions of the state, the committee reported adversely to the proposition, because its acceptance would alienate many of the most worthy members, and through a disunited membership would make desired advancement in legislation an impossibility.

The plan of reorganization alluded to above was perfected, in consequence of which the association has now a membership of about 3400 registered pharmacists. Details of the perfected scheme have not been received by the editor.

The *Michigan State Pharmaceutical Association* convened at Detroit, Sept. 4th, while the American Pharmaceutical Association was in session, and on the evening of Tuesday held a joint session with the Section on Commercial Interests of the latter Association. President Bassett presided at the different sessions and presented a suggestive annual address. Reports of various officers and of the several committees were read and acted upon. Among the papers read were the following: Use of Mayer's reagent (see *AMERICAN JOURNAL OF PHARMACY*, Oct. 6, p. 487); adulterated ground elm bark; constituents of buchu; valuation of dialyzed iron; nicotine in cigarettes; assay of tincture of *nux vomica*; agnin; reactions of aniline colors upon volatile oils, etc. Legislation in regard to patent medicines being required to have the full formula printed on the label of each package was favorably considered.

The officers for the ensuing year are: George Gundrum, Ionia, president; F. M. Alsdorf, Lansing, H. M. Dean, Niles, and O. Eberbach, vice-presidents; H. J. Brown, Ann Arbor, secretary, and William Dupont, Detroit, treasurer.

The following printed Proceedings have been received:

*Alabama*.—Pp. 33. See July number, p. 375.

*Kentucky*.—Pp. 60. See July number, p. 376.

*Ohio*.—Pp. 144. See September number, p. 478.

*Texas*.—Pp. 59. See August number, p. 427.

## PHARMACEUTICAL COLLEGES.

*The Colleges of Pharmacy*, located east of the Rocky Mountains, have opened their lecture rooms about October 1st, the attendance, as far as we have learned, being equal to, or exceeding that of former years. While it is gratifying to notice the continuous spreading of pharmaceutical education, the necessity for it is doubtless, even at the present time, not as fully appreciated as it should be; for we have learned that the Pennsylvania Pharmacy Board at the examinations held during the early part of October found it necessary to refuse registration to forty out of seventy three applicants; only thirty three of the candidates, or about forty five per cent. were sufficiently prepared for passing the examination. It is evident from such a record, that there must be still a considerable number of aspiring young men, who consider shop routine, perhaps supplemented by a process of coaching or cramming, as being quite sufficient for becoming a pharmacist at the present time.

On the other hand it is likewise gratifying to observe the continually increasing number of those devoting their whole time to study in the laboratories and the lecture rooms of a college, and extending their laboratory work even to the recess between the lecture seasons. The two courses of lectures which are required as the minimum time of study are very frequently voluntarily extended by students to three or four courses, and as a rule to their advantage. Training in the rudiments of science should, wherever possible, precede apprenticeship; but this advantage has usually not been enjoyed by those who have passed through a grammar school, or even through the lower classes of a high school; to them a division of the college labor will always prove of vast benefit, the more so, in case shop duties interfere, more or less, with the study of the subjects presented in the lectures.

*The Chicago College of Pharmacy* held its semi-annual meeting September 18th, when a large sum was appropriated for the expenses of the institution for the ensuing six months. The committee to whom was delegated the transfer in trust of the Chicago College of Pharmacy to the Illinois Pharmaceutical Association, reported that the tender of the college had been made in due form and received by the Association. A special committee was appointed for the completion of the object. The resignation of Mr. F. M. Schmidt from the Board of Trustees was read, accepted, and Mr. C. S. Hallberg was chosen in his place.

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## REVIEWS AND BIBLIOGRAPHICAL NOTICES.

*Manual of Chemistry.* A guide to lectures and laboratory work for beginners in chemistry. A text-book specially adapted for students of pharmacy and medicine. By W. Simon, Ph. D., M.D., Professor of Chemistry and Toxicology in the College of Physicians and Surgeons; Professor of Chemistry and Analytical Chemistry in the Maryland College of Pharmacy. Second edition. Thoroughly revised and greatly enlarged; with

44 illustrations and 7 colored plates, representing 56 chemical reactions. Philadelphia, Lea Brothers & Co., 1888; 8vo., pp. 479. Price, \$3.25.

The features of the new edition of this meritorious work remain essentially the same as in the first edition. As a matter of course, all the new observations and discoveries made since its first appearance, and which fall within its scope, have been faithfully noticed; but in addition to this, some portions of the principles of chemistry and of the inorganic compounds required amplification, a chapter on quantitative determinations has been added, and the sixth part, treating of the carbon compounds, has been, in part rearranged and reclassified. Nearly thirty well-executed wood-cuts have been prepared for illustrating the text, in addition to those contained in the first edition; and under the heading "Experiment," brief directions are given in the various chapters, intended to aid the student in experimental work. The commendation bestowed upon the work when it made its first appearance, nearly four years ago, we take great pleasure in extending also to the present volume, feeling assured that it will be found a trustworthy guide for the study of chemistry by students of pharmacy and medicine.

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*The Chemistry of Pharmacy.* An exposition of chemical science in its relations to medicinal substances according to a practical and original plan. By R. Rother, graduate of the University of Michigan, Department of Chemistry, etc. Detroit, Mich.: Wm. Graham Printing Company. 1888. 8vo. Pp. 71.

The little volume before us appears to be the forerunner of one devoted to pharmaceutical chemistry, and confines itself mainly to theoretical considerations, which, with the philosophic treatment received at the hands of the author, are presented in a concise but lucid manner. The single chapter of the book is headed, "The Definitions and Methods of Chemistry," and is divided into four sections, respectively entitled: Chemical Principles; Chemical Terminology; Chemical Formule, and Chemical Equations. The evolution of the different classes of compounds, their constitution, chemical relation and alteration, etc., etc., are happily explained, and will afford instructive reading to the intelligent pharmacist desirous to make himself acquainted with the foundation upon which chemistry rests, one of the most important branches of pharmacy.

The work is handsomely printed upon good paper, and substantially bound in cloth, and may be obtained from the author at 50 cents a copy, or by mail, 60 cents.

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*Chemical Lecture Notes*, taken from Prof. C. O. Curtman's lectures at the St. Louis College of Pharmacy. By H. M. Whelpley, Ph.G., Professor of Microscopy and Quizmaster of Pharmacognosy and Botany in the St. Louis College of Pharmacy, etc. Second edition, revised and enlarged by the addition of notes on the metals. St. Louis, Mo.: Published by the author. 8vo. Pp. 211. Price, cloth, \$1.50.

In the first edition, these "Lecture Notes" were confined to chemical

physics and to the non-metallic elements; in the present edition they are extended so as to include also the metals, so that the work now embraces the whole range of inorganic chemistry. Of the carbon compounds, usually denominated organic compounds, a few only, with hydrogen, are considered, namely: Marsh gas, acetylene, olefiant gas, and illuminating gas. As indicated by the title, the work is mainly intended to serve the purpose of notes on lectures on the branches indicated, and it serves this purpose very well.

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*Chemical Experiments for Medical Students*, arranged after Beilstein. By W. S. Christopher, M. D., Demonstrator of Chemistry, Medical College of Ohio, Cincinnati. Cincinnati: Robert Clarke & Co., 1888. 12mo. Pp. 84. Price, cloth, \$1.

Beilstein's elementary work for laboratory practice was made available to the American student five years ago, when Professor Curtman of St. Louis translated it, and made many additions, so as to adapt it to the wants of this country. As this work has passed through a second edition, a new version of the original work would scarcely appear to be necessary. The present editor's object was to limit the number of experiments. In our opinion, a more thorough chemical knowledge would be of vast benefit to the medical student.

The text is printed on good, strong paper, and the book is provided with a number of blank leaves for the addition of notes by the student.

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*Therapeutics; its Principles and Practice*. By H. C. Wood, M. D., LL. D., Professor of *materia medica* and *therapeutics*, and clinical Professor of diseases of the nervous system, in the University of Pennsylvania. A work on medical agencies, drugs and poisons, with especial reference to the relation between physiology and clinical medicine. The seventh edition of a Treatise on *Therapeutics*, rearranged, rewritten and enlarged. Philadelphia: J. B. Lippincott Company. 1888. 8vo. Pp. 908. Price, cloth \$6.00.

The lengthy title of the present edition of this work is sufficiently descriptive of its aims and objects. Having been written for the use of the physician, prominence is given, as a matter of course, to physiological action, therapeutic uses, toxic effects, administration and doses, while the pharmaco-gностical, chemical and pharmaceutical relations of the drugs are necessarily quite briefly mentioned. The arrangement and classification of the material have been described somewhat in detail in notices of former editions; they have been somewhat altered, and as at present adopted seem to be more convenient for consultation. Thus for instance the remedial agents and measures which are not drugs, now form Part I, instead of the last part as heretofore; and of the drugs the general remedies are divided into the three orders, nervines, cardians, and nutritants, each order being again subdivided into families, corresponding to analogous subdivisions in former issues.

*A Textbook of Pharmacology, Therapeutics and Materia Medica.* By T. Lauder Brunton, M. D., D. Sc., F. R. S., etc. Adapted to the United States Pharmacopoeia by Francis H. Williams, M. D., Boston, Mass. Third edition. Philadelphia: Lea Brothers and Co. 1888. 8vo. Pp. 1261. Price in cloth \$5.50: leather \$6.50.

When a work like this requires the publication of three editions within three years it must possess special merits to secure for it undiminished favor. We have pointed this out on a former occasion, and now reiterate briefly that the systematic arrangement, the precise and correct statements, the clear and exact deductions and directions render it useful alike to the medical student and practitioner, and likewise to the pharmacist. While the latter is not especially—but merely in a general way—interested in general pharmacology and therapeutics, of which the first section speaks upon 500 pages, all the following sections have a direct application to his vocation. Under general pharmacy we find the galenical preparations of the British and United States Pharmacopoeias grouped together, with references as to strength and doses. Inorganic materia medica treats of the elements and their medicinal compounds, with the exception of the carbon compounds, which are noticed under organic materia medica, without including the crude vegetable and animal drugs, the two classes being comprised in the last two sections. The copious index arranged in three parts—general, diseases and remedies, and bibliographical—covers 160 pages, and renders every item contained in the book easily available. The present edition will doubtless prove to be at least equal in value and usefulness to those that preceded it. New remedies which promise to be of more than mere transient use, have been embodied in their proper places, and the illustrations have been increased to 230 in number.

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*Notes on New Remedies.* Under this title Messrs. Lehn & Fink of New York publish a periodical, of which No. 5 for October has been received, and which is intended to collect the observations made with newly introduced remedies, and more particularly those which have been obtained by synthesis. These "Notes" will be mailed on request to the publishers.

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*Guide Book for Distillers and Manufacturers of Arrack, Cognac, Gin, Rum, Cordials, Liqueurs, etc.* By E. Sachsse & Co., Leipzig.

Those who wish to learn how French brandy, Jamaica rum, different kinds of whisky, etc., may be prepared from alcohol, and how cider and the different kinds of grape wine may be imitated, will find instructions in this pamphlet. As we regard sophistication as a crime, and imitation—unless sold as such—as a fraud, the formulas contained in this pamphlet are of little use to us.

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*Bericht von Schimmel & Co. (Gebr. Fritzsche) in Leipzig.*

A report on essential oils, the sources of supply, causes of fluctuations in price, etc., information which is valuable for reference.